State of California

Business, Transportation and Housing Agency

Memorandum

To : Deputy District Directors,
Project Development
Ken Bandow, Chief
Central Design Branch
Jim Roberts, Chief
Office of Structures

Date : January 6, 1989

File No.: New Standard Plan

From : **DEPARTMENT OF TRANSPORTATION**

Subject: New Standard Plan NSP D79

At the request of the Office of Structures, New Standard Plan NSP D79 is being issued for direct design method precast reinforced concrete pipe (RCP). Direct design method RCP (thin wall) is being allowed as an option to the RCP class and D-load requirements of the specifications. When RCP is included in the project either by contract item or as an alternative, NSP D79 and the appropriate special provisions are to be included.

Standard Special Provision 65.01, dated January 17, 1989, (copy attached) is to be included in the special provisions when NSP D79 is used.

Headquarters will insert the New Standard Plan into projects when PS&E submittals include RCP.

Attached is an 8-1/2"x11" print of the New Standard Plan, a copy of the revised Standards Plans List and a list of all revisions to the January, 1988 Standard Plans book as of November 14, 1988, and SSP 65.01, dated January 17, 1989.

Preston W. Kelley

PRESTON W. KELLEY
Office Engineer

Attachments

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

To accompany plans dated _____

GENERAL ROAD WORK

- ☐ A-10A Abbreviation
- ☐ A-10B Symbols
- ☐ A20-A Pavement Markers and Traffic Lines, Typical Details
- ☐ A20-B Pavement Markers and Traffic Lines, Typical Details
- ☐ A20-C Pavement Markers and Traffic Lines, Typical Details
- ☐ A-24A Pavement Markings-Arrows
- ☐ A-24B Pavement Markings-Arrows and Symbols
- ☐ A-24C Pavement Markings-Words
- ☐ A-24D Pavement Markings-Words and Crosswalks
- ☐ A35-A P.C.C. Paving Details
- ☐ A62-A Excavation and Backfill Miscellaneous Limits of Payment
- ☐ A62-B Excavation and Backfill Bridge Surcharge and Wall-Limits of Payment
- ☐ A62-C Excavation and Backfill Bridge-Limits of Payment
- ☐ A62-D Excavation and Backfill Details Concrete and Pipe Culverts
- ☐ A62-E Excavation and Backfill Details Reinforced Concrete Box and Arch Culverts
- ☐ A62-F Excavation and Backfill Details Metal Culverts
- ☐ A73 Type III Barricade and Object Markers
- ☐ A74-A Markers and Delineators
- ☐ A74-B Survey Monuments
- ☐ A75-A Concrete Barrier Type 50
- ☐ A75-B Concrete Barrier Type 50
- ☐ A75-C Headlight Glare Screen
- ☐ A77C-1 Metal Beam Guard Rail-Standard Hardware
- ☐ A77C-2 Metal Beam Guard Railing
- ☐ A77-D Barrier and Guard Rail Anchors
- ☐ A77-E Cable Anchor Assembly (Breakaway)
- ☐ A77-F Thrie Beam Barrier
- ☐ A77-G Thrie Beam Barrier
- ☐ A79-A Guard Rail Flares
- ☐ A79-B Miscellaneous Guard Rail Details
- ☐ A79-C Guard Rail Connections to Bridge Rails, Retaining Walls and Abutments
- ☐ A79-D Guard Rail Connections to Bridge Sidewalks and Curbs
- ☐ A79-E Thrie Beam Connection to Type 50 Barrier
- ☐ A80 Emergency Passageways
- ☐ A83 Portable Scale Pad and Approach Pad Details
- ☐ C7-A1 Reinforced Concrete Crib Wall Battered Walls-Type A, B, and C
- ☐ C7-A2 Reinforced Concrete Crib Wall Battered Walls Type D, E, and F
- ☐ C7-A3 Reinforced Concrete Crib Wall Vertical Walls Type A, B, and C
- ☐ C7-A4 Reinforced Concrete Crib Wall Vertical Walls-Type D, E, & F
- ☐ C7-A5 Reinforced Concrete Crib Wall Type A, B, C, D, E, & F Header and Stretcher Details
- ☐ C7-B1 Reinforced Concrete Crib Wall Foundation Pressure-Battered Wall
- ☐ C7-B2 Reinforced Concrete Crib Wall Foundation Pressure-Vertical Wall
- ☐ C8-A Steel Crib Wall-Construction Details
- ☐ C8-B Steel Crib Wall-Design Data
- ☐ C8-C Steel Crib Wall-Design Data
- ☐ C9-A Timber Crib Wall Types A, B, C, and D Construction Details
- ☐ C9-B Timber Crib Wall Types A, B, C, and D Design Data
- ☐ D72 Drainage Inlets-OS, OL, UL
- ☐ D73 Drainage Inlets-G1, G2, G3, G4, G5, G6
- ☐ D74 Drainage Inlets-G11, G12, G13, G14, G0, G00
- ☐ D75 Pipe Inlets
- ☐ D77-A Grate Details
- ☐ D77-B Bicycle Proof Grate Details
- ☐ D78 Gutter Depressions
- ☐ D80 Single Box Culvert
- ☐ D81 Double Box Culvert
- ☐ D83 Box Culvert Miscellaneous Details
- ☐ D84 Box Culvert Wingwalls, Types A, B, C
- ☐ D85 Box Culvert Wingwalls, Types D & E
- ☐ D86-A Box Culvert Warped Wingwalls
- ☐ D86-B Pipe Culvert Wingwalls, Endwalls and Warped Wingwalls
- ☐ D86-C Arch Culvert Wingwalls, Endwalls and Warped Wingwalls
- ☐ D87-A Overside Drains
- ☐ D87-B Overside Drains
- ☐ *RSP C8FC Underdrains*
- ☐ D88 Construction Loads on Culverts
- ☐ D89 Pipe Headwalls and Strut Details
- ☐ D90 Pipe Culvert Headwalls, Endwalls & Wingwalls Types A, B, & C
- ☐ D93 Drainage Inlet Riser Connections
- ☐ D94 Flared End Sections
- ☐ D95 Concrete Arch Culverts
- ☐ D96 Pipe Riser with Debris Rack Cage
- ☐ D97A CMP Coupling Band Details No. 1, Flanged End CSP Channel Coupling Band Details - Downdrains, Standard Positive Joints
- ☐ D97B-1 CMP Coupling Band Details No. 2, Annular, Reformed end, and Helical Coupling Bands Downdrains, Standard and Positive Joints
- ☐ D97B-2 CMP Coupling Band Details No. 3, Flanged End CSP Channel Coupling Band Details - Downdrains, Standard and Positive Joints
- ☐ D97C-1 CMP Coupling Band Details No. 4, Universal Coupling Bands Standard and Positive Joints
- ☐ D97C-2 CMP Coupling Band Details No. 5, Universal Coupling Bands Standard and Positive Joints
- ☐ D97D CMP Coupling Details No. 6 - Standard Joint
- ☐ D97E-1 CMP Coupling Details No. 7 - Positive Joint
- ☐ D97E-2 CMP Coupling Details No. 8 - Positive Joints and Downdrains
- ☐ D97-F Reinforced Concrete Pipe or Non-Reinforced Concrete Pipe Standard and Positive Joints
- ☐ D98-A Standard Inlet Structure Shoulder Installation and Details of Slotted Drain Connections
- ☐ D98-B 12" Thru 24" Slotted C.S.P. Drain Details
- ☐ D98-C Alternative Hinged Cover for Type OL & OS Inlets and Trash Rack for Type OCP Inlet
- ☐ D98D-1 Structural Section Drainage System Details
- ☐ D98D-2 Edge Drain Outlet and Vent Details
- ☐ D98D-3 Edge Drain Cleanout
- ☐ D98D-4 Cross Drain Interceptor Details
- ☐ F-10 Chain Link Fence
- ☐ F-20 Barbed Wire and Wire Mesh Fence
- ☐ N8-A Curbs, Dikes and Driveways
- ☐ N8-B Wheelchair Ramp Detail No. 1
- ☐ N8-C Wheelchair Ramp Detail No. 2
- ☐ T-10 Traffic Control System for Lane Closure on Freeways and Expressways, Miscellaneous Details
- ☐ T-11 Traffic Control System for Lane Closure on Multilane Conventional Highways, Miscellaneous Details
- ☐ *RSP T12 Traffic Control System for Lane Closure on Multilane Conventional Highways, Miscellaneous Details*
- ☐ T-13 Traffic Control System for Lane Closure on Two Lane Conventional Highways
- ☐ T-14 Details for Ramp Closures, Miscellaneous Details

BRIDGE

- ☐ B0-1 Bridge Details
- ☐ B0-3 Bridge Details
- ☐ B0-5 Bridge Details
- ☐ B0-13 Bridge Details
- ☐ B2-3 16" Cast-In-Drilled-Hole Concrete Pipe
- ☐ B2-5 Pile Details - Class 45 and Class 70
- ☐ B2-8 Pile Details - Class 45C and Class 70C
- ☐ B2-9 Load Test Anchor Pile Details
- ☐ B3-1 Retaining Wall - Type 1 H=4'-30'
- ☐ B3-2 Retaining Wall - Type 1 H=32'-36'
- ☐ B3-3 Retaining Wall - Type 1A
- ☐ B3-4 Retaining Wall - Type 2
- ☐ B3-5 Counterfort Retaining Wall - Type 3
- ☐ B3-6 Counterfort Retaining Wall - Type 4
- ☐ B3-7 Retaining Wall - Type 5
- ☐ B3-8 Retaining Wall Details No. 1
- ☐ B3-9 Retaining Wall Details No. 2
- ☐ B3-11 Retaining Wall Type 6 - 6' Max.
- ☐ B6-1 T-Beam Details
- ☐ B6-10 Utility Openings - T-Beam
- ☐ B6-21 Joint Seals
- ☐ B7-1 Box Girder Details
- ☐ B7-5 Deck Drains
- ☐ B7-6 Deck Drains - Type D-1 and D-2
- ☐ B7-10 Utility Opening - Box Girder
- ☐ B7-11 Utility Details
- ☐ B8-5 Cast-In-Place Prestressed Girder Details
- ☐ B11-7 Chain Link Railing
- ☐ B11-30 Temporary Railing (Type K)
- ☐ B11-47 Cable Railing
- ☐ B11-51 Tubular Hand Railing
- ☐ B11-52 Chain Link Railing Type 7
- ☐ B11-53 Concrete Barrier Type 25
- ☐ B11-54 Concrete Barrier Type 26
- ☐ B13-1 Slope Protection Detail No. 1
- ☐ B13-2 Slope Protection Detail No. 2
- ☐ B14-1 Structural Steel Plate Vehicular Undercrossing
- ☐ B14-2 Structural Steel Plate Arches
- ☐ B14-3 Supply Line and Communication and Sprinkler Control Conduit
- ☐ B14-4 Supply Line

SIGNS, SIGNALS & LIGHTING

OVERHEAD SIGNS - TRUSS

- ☐ S1-12 Overhead Signs, Truss, Instructions and Examples
- ☐ S2-11 Overhead Signs, Truss, Single Post Type, Post Type II thru VII
- ☐ S3-11 Overhead Signs, Truss, Two Post Type, Post Type I-S thru VII-S
- ☐ S4-6 Overhead Signs, Truss, Single Post Type, Structural Frame Members
- ☐ S5-6 Overhead Signs, Truss, Two Post Type, Structural Frame Members
- ☐ S6-8 Overhead Signs, Truss, Structural Frame Details
- ☐ S7-8 Overhead Signs, Truss, Frame Juncture Details
- ☐ S8B Overhead Signs, Steel Frame Removable Sign Panel Frames
- ☐ S8-BA Overhead Formed Panel Details for Mounting on Removable Sign Panel Frames
- ☐ S8C Overhead Signs, Truss, Sign Panel Mounting Details Laminated Panel, Type A
- ☐ S8D Overhead Signs, Truss, Removable Sign Panel Frames 110° and 120° Sign Panels
- ☐ S9-12 Overhead Signs, Roliway Details No. 1
- ☐ S10-9 Overhead Signs, Roliway Details No. 2
- ☐ S11-10 Overhead Signs, Roliway Safety Railing Details
- ☐ S13-10 Overhead Signs, Truss, Pile Foundation

OVERHEAD SIGNS - LIGHTWEIGHT

- ☐ S14A-5 Overhead Signs, Lightweight, Balanced-Single Steel Post Connection and Mounting Details
- ☐ S14B-4 Overhead Signs, Lightweight, Balanced-Single Steel Post Details
- ☐ S15-8 Overhead Signs, Lightweight, Type A, Connection Details
- ☐ S16-7 Overhead Signs, Lightweight, Type B, Connection Details
- ☐ S17-8 Overhead Signs, Lightweight, Type C, Connection Details
- ☐ S18A-8 Overhead Signs, Lightweight, Sign Panel Mounting Details, Laminated Panel, Type A
- ☐ S18B-7 Overhead Signs, Lightweight, Light Fixture Mounting Details
- ☐ S20A-7 Overhead Signs, Lightweight, Post Details
- ☐ S20B-9 Overhead Signs, Lightweight, Foundation

OVERHEAD SIGNS - BOX BEAM CLOSED TRUSS ALTERNATIVE

- ☐ S39-6 Overhead Signs, Box Beam, Closed Truss Alternative, Foundation
- ☐ S40A-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Frame Members
- ☐ S40B-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single and Two Post Type General Frame Details
- ☐ S40C-1 Overhead Signs, Box Beam, Closed Truss Alternative, Ribbed Sheet Metal Details
- ☐ S40D-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Frame Details
- ☐ S40E-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Frame Juncture Details
- ☐ S40F-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Post Details
- ☐ S40G-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Type Frame Members
- ☐ S40H-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Cantilever Frame Details
- ☐ S40I-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Cantilever Frame Juncture Details
- ☐ S40J-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Cantilever Post Details
- ☐ S40K-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Butterfly Frame Details
- ☐ S40L-3 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Butterfly Frame Juncture Details
- ☐ S40M-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Butterfly Post Details

OVERHEAD SIGNS - TUBULAR

- ☐ S40N Overhead Signs, Tubular, Instructions and Examples
- ☐ S40P Overhead Signs, Tubular, Single Post Type Layout and Pipe Selection
- ☐ S40Q Overhead Signs, Tubular, Two Post Type Layout and Pipe Sections
- ☐ S40R Overhead Signs, Tubular, Structural Frame Details No. 1
- ☐ S40S Overhead Signs, Tubular, Structural Frame Details No. 2
- ☐ S40T Overhead Signs, Tubular, Foundation Details

ROADSIDE SIGNS

- ☐ S43-3 Roadside Signs, Typical Installation Details No. 1
- ☐ S43-15 Roadside Signs, Wood Posts, Typical Installation Details No. 2
- ☐ S43-A Roadside Signs, Laminated Wood Box Posts Typical Installation Details No. 3
- ☐ S43-B Roadside Signs, Steel Post, Typical Installation Details
- ☐ S44-7 Roadside Signs, Typical Installation Details No. 4

SIGNAL AND LIGHTING DETAILS

- ☐ ES-1A Signal and Lighting Details, Symbols and Abbreviations
- ☐ ES-1B Signal and Lighting Details, Symbols and Abbreviations
- ☐ ES-2A Signal and Lighting Details, Service Equipment
- ☐ ES-2B Signal and Lighting Details, Service Equipment
- ☐ ES-2C Signal and Lighting Details, Service Equipment
- ☐ ES-2D Signal and Lighting Details, Service Equipment
- ☐ ES-2E Signal and Lighting Details, Service Equipment and Typical Wiring Diagram
- ☐ ES-3A Signal and Lighting Details, Signal Heads and Mountings
- ☐ ES-3B Signal and Lighting Details, Signal Heads and Mountings
- ☐ ES-3C Signal and Lighting Details, Signal Heads and Mountings
- ☐ ES-3D Signal and Lighting Details, Signal Heads and Mountings
- ☐ ES-3E Signal and Lighting Details, Signal Heads and Mountings
- ☐ ES-4A Signal and Lighting Details, Controller Cabinet Details
- ☐ ES-4B Signal and Lighting Details, Controller Cabinet Details
- ☐ ES-4C Signal and Lighting Details, Controller Cabinet Details
- ☐ ES-5A Signal and Lighting Details, Detectors
- ☐ ES-5B Signal and Lighting Details, Detectors
- ☐ ES-5C Signal and Lighting Details, Detectors
- ☐ ES-5D Signal and Lighting Details, Detectors
- ☐ ES-5E Signal and Lighting Details, Detectors
- ☐ ES-5F Signal and Lighting Details, Pedestrian Barricades
- ☐ ES-6A Signal and Lighting Standards Type 1 Standards and Pushbutton Posts
- ☐ ES-6B Lighting Standards, Types 15 and 21
- ☐ ES-6D Lighting Standards, Types 30 and 31
- ☐ ES-6DA Lighting Standards, Type 32
- ☐ ES-6E Lighting Standards, Types 30 and 31, Base Plate Details
- ☐ ES-6F 10 Degree Lighting Standards
- ☐ ES-6H 10 Degree Lighting Standards Details
- ☐ ES-6J Signal and Lighting Standards Case 1 Arm Loading, Wind Velocity = 70 MPH Arm Lengths 15' to 30'
- ☐ ES-6K Signal and Lighting Standards Case 2 Arm Loading, Wind Velocity = 70 MPH Arm Lengths 20' to 30'
- ☐ ES-6L Signal and Lighting Standards Case 3 Arm Loading, Wind Velocity = 70 MPH Arm Lengths 20' to 45'
- ☐ ES-6M Signal and Lighting Standards Case 4 Arm Loading, Wind Velocity = 70 MPH Arm Lengths 25' to 45'
- ☐ ES-6MA Signal and Lighting Standards Case 5 Arm Loading, Wind Velocity = 70 MPH Arm Lengths 50' to 55'
- ☐ ES-6N Signal and Lighting Standards Type 40-0-80
- ☐ ES-6O Signal and Lighting Standards Case 1 Arm Loading, Wind Velocity = 80 MPH Arm Lengths 25' to 30'
- ☐ ES-6P Signal and Lighting Standards Case 2 Arm Loading, Wind Velocity = 80 MPH Arm Lengths 20' to 30'
- ☐ ES-6Q Signal and Lighting Standards Case 3 Arm Loading, Wind Velocity = 80 MPH Arm Lengths 20' to 45'
- ☐ ES-6R Signal and Lighting Standards Case 4 Arm Loading, Wind Velocity = 80 MPH Arm Lengths 25' to 45'
- ☐ ES-6RA Signal and Lighting Standards Case 5 Arm Loading, Wind Velocity = 80 MPH Arm Lengths 50' to 55'
- ☐ ES-6S Signal and Lighting Standards Details No. 1
- ☐ ES-6T Signal and Lighting Standards Details No. 2
- ☐ ES-6U Slip Base Insert for Type 10 and 15 Lighting Standards
- ☐ ES-6V Left Turn Signal and Sign Standard Type 33
- ☐ ES-7A Signal and Lighting Details, Electrical Details Structure Installations
- ☐ ES-7B Signal and Lighting Details, Electrical Details Structure Installations
- ☐ ES-7C Signal and Lighting Details, Electrical Details Structure Installations
- ☐ ES-7D Signal and Lighting Details, Electrical Details Structure Installations
- ☐ ES-7E Signal and Lighting Details, Electrical Details Structure Installations
- ☐ ES-7F Signal and Lighting Details, Electrical Details Structure Installations
- ☐ ES-8 Signal and Lighting Details, Pull Box Details
- ☐ ES-9A Cantilever Flashing Beacon Details, Types 9, 9A, 9B
- ☐ ES-9B Cantilever Flashing Beacon Details, Types 9, 9A, 9B
- ☐ ES-10 Signal and Lighting Details, Isolux Diagrams
- ☐ ES-11 Signal and Lighting Details, Foundation Installations
- ☐ ES-12 Pedestrian Undercrossing Flourescent Lighting Fixture
- ☐ ES-13 Signal and Lighting Details, Splicing Details
- ☐ ES-14 Signal and Lighting Details, Wiring Details and Fuse Ratings
- ☐ ES-15 Pedestrian Overcrossing Flourescent Lighting Fixture

EXTINGUISHABLE MESSAGE SIGN

- ☐ ES-27A Extinguishable Message Sign, 10" Letters
- ☐ ES-27B Extinguishable Message Sign, 10" Letters
- ☐ ES-28 Extinguishable Message Sign and Flashing Beacons

SIGN LIGHTING DETAILS

- ☐ ES-29 Mercury Sign Lighting Equipment
- ☐ ES-30 36" Flourescent Sign Lighting Equipment
- ☐ ES-32A Sign Lighting Equipment
- ☐ ES-32B Signal and Lighting Details, Sign Lighting Control
- ☐ ES-33 Internally Illuminated Street Name Sign

NEW STANDARD PLANS

- ☐ *RSP C19 Precast Reinforced Concrete Pipe Direct Design Method*

STANDARD PLANS LIST

(January, 1988 Edition)
Revised 12/16/88

The Standard Plan sheets indicated by a marked box are applicable to this CONTRACT NO.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS

CHIEF, OFFICE OF STRUCTURE DESIGN
REGISTERED ENGINEER - CIVIL

December 16, 1988
PLANS APPROVAL DATE

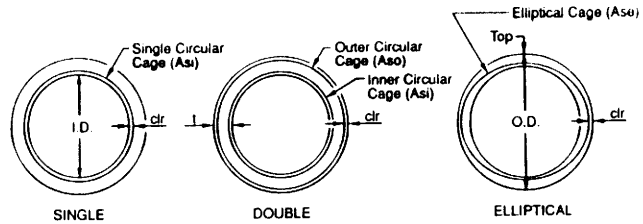
REGISTERED PROFESSIONAL ENGINEER
S. D. NEWELL
No. 13784
Exp. 03-31-89
CIVIL
STATE OF CALIFORNIA

f'c = 6000 psi

		WALL A																			
		10' MAX. COVER									20' MAX. COVER									40' MAX. COVER	
I.D.	t	METHOD 1			METHOD 2			METHOD 3B			METHOD 1			METHOD 2			METHOD 3B			METHOD 3B	
IN INCHES		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso
24	2 1/2	.11	—	—	.06	—	—	.05	—	—	.25	—	—	.13	—	—	.10	—	—	.21	—
30	2 3/4	.15	—	—	.09	—	—	.07	—	—	.31	—	—	.17	—	—	.13	—	—	.28	—
36	3	.18	.09	.20	.10	.06	.11	.07	.05	.08	.41	.18	.41	.22	.14	.23	.15	.10	.16	.33	.22
42	3 1/2	.20	.09	.21	.11	.07	.12	.08	.05	.09	.44	.20	.44	.23	.14	.25	.16	.10	.18	.35	.23
48	4	.22	.10	.23	.12	.08	.14	.09	.06	.10	.48	.21	.51	.25	.16	.27	.18	.11	.19	.37	.25
54	4 1/2	.24	.11	.25	.14	.08	.15	.10	.06	.11	.53	.23	.56	.27	.17	.29	.19	.12	.21	.40	.26
60	5	.26	.12	.28	.15	.09	.16	.11	.07	.12	.57	.24	.61	.29	.18	.32	.21	.13	.22	.43	.28
66	5 1/2	.28	.13	.30	.16	.10	.18	.12	.07	.13	.62	.26	.66	.31	.20	.34	.22	.14	.24	.47	.30
72	6	.30	.14	.32	.17	.11	.19	.13	.08	.14	.67	.28	.71	.34	.21	.37	.24	.15	.26	.50	.33
78	6 1/2	.32	.15	.35	.19	.12	.20	.14	.09	.15	.72	.30	.77	.36	.23	.39	.26	.16	.28	.54	.35
84	7	—	—	—	.20	.13	.22	.15	.09	.16	—	—	—	.38	.24	.42	.27	.18	.30	.57	.37
90	7 1/2	—	—	—	.22	.14	.24	.16	.10	.17	—	—	—	.41	.26	.45	.29	.19	.32	.61	.39
96	8	—	—	—	.23	.14	.25	.17	.11	.18	—	—	—	.44	.28	.47	.31	.20	.34	.65	.41
102	8 1/2	—	—	—	.25	.15	.27	.18	.11	.20	—	—	—	.46	.29	.50	.33	.21	.36	.69	.44
108	9	—	—	—	.26	.16	.29	.19	.12	.21	—	—	—	.49	.31	.53	.35	.22	.38	.73	.46

f'c = 6000 psi
f'c = 6500 psi

		WALL AA	
		80' MAX. COVER	
I.D.	t	METHOD 3C	
IN INCHES		Asi	Aso
24	5 3/4	.15	.06
30	6	.19	.06
36	6 1/2	.24	.07
42	7	.30	.10
48	7 1/2	.36	.14
54	8	.41	.17
60	8 1/2	.47	.22
66	9	.52	.25
72	9 1/2	.58	.30
78	10	.65	.34
84	10 1/2	.71	.38
90	11	.77	.43
96	11 1/2	.83	.46
102	12	.92	.51
108	12 1/2	1.01	.56



f'c = 5000 psi

		WALL B																			
		10' MAX. COVER									20' MAX. COVER									40' MAX. COVER	
I.D.	t	METHOD 1			METHOD 2			METHOD 3B			METHOD 1			METHOD 2			METHOD 3B			METHOD 3B	
IN INCHES		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso
24	3	.10	—	—	.06	—	—	.04	—	—	.23	—	—	.11	—	—	.08	—	—	.18	—
30	3 1/2	.12	—	—	.08	—	—	.06	—	—	.27	—	—	.15	—	—	.11	—	—	.24	—
36	4	.13	.06	.14	.08	.04	.08	.06	.03	.06	.26	.11	.28	.15	.08	.16	.11	.06	.12	.24	.14
42	4 1/2	.15	.07	.16	.09	.05	.10	.07	.04	.07	.30	.13	.32	.17	.10	.19	.13	.07	.14	.27	.16
48	5	.17	.08	.19	.10	.06	.11	.08	.04	.08	.34	.15	.37	.20	.11	.22	.15	.09	.16	.31	.19
54	5 1/2	.19	.09	.21	.11	.07	.12	.09	.05	.10	.38	.17	.42	.22	.13	.24	.17	.10	.18	.35	.21
60	6	.21	.09	.24	.13	.07	.14	.10	.06	.11	.45	.19	.46	.24	.14	.27	.18	.11	.20	.38	.23
66	6 1/2	.24	.11	.26	.14	.08	.15	.11	.06	.12	.54	.21	.51	.27	.16	.29	.20	.12	.22	.41	.26
72	7	.26	.12	.29	.15	.09	.17	.12	.07	.13	.63	.24	.57	.29	.18	.32	.22	.13	.24	.45	.29
78	7 1/2	.29	.13	.31	.17	.10	.18	.13	.08	.14	.73	.26	.63	.32	.19	.35	.24	.15	.27	.49	.31
84	8	—	—	—	.18	.11	.20	.14	.08	.15	—	—	—	.35	.21	.38	.26	.16	.28	.52	.33
90	8 1/2	—	—	—	.20	.12	.21	.15	.09	.16	—	—	—	.37	.22	.40	.28	.17	.30	.56	.36
96	9	—	—	—	.21	.13	.23	.16	.10	.18	—	—	—	.39	.24	.43	.30	.18	.33	.60	.38
102	9 1/2	—	—	—	.23	.14	.25	.17	.10	.19	—	—	—	.42	.26	.46	.31	.19	.34	.63	.40
108	10	—	—	—	.24	.15	.26	.18	.11	.20	—	—	—	.45	.27	.49	.33	.21	.36	.67	.43

f'c = 5000 psi
f'c = 6000 psi

		WALL BB	
		80' MAX. COVER	
I.D.	t	METHOD 3C	
IN INCHES		Asi	Aso
24	6 3/4	.12	.06
30	7	.17	.06
36	7 1/2	.22	.06
42	8	.26	.06
48	8 1/2	.32	.10
54	9	.37	.13
60	9 1/2	.43	.17
66	10	.50	.22
72	10 1/2	.54	.25
78	11	.60	.28
84	11 1/2	.66	.32
90	12	.71	.36
96	12 1/2	.76	.40
102	13	.82	.45
108	13 1/2	.91	.50

CAGE REINFORCEMENT

t = Pipe barrel wall thickness, in.
Asi = Inner cage reinforcement, or single circular cage reinforcement, sq. in./lin. ft.
Aso = Outer cage reinforcement, sq. in./lin. ft.
Ase = Elliptical single cage reinforcement, sq. in./lin. ft.
I.D. = Inside Diameter, in.
O.D. = Outside Diameter, in.
clr. (typ) = Design clearance, in. (see note 6)

f'c = 6000 psi

		WALL X															
		10' MAX. COVER						20' MAX. COVER						30' MAX. COVER			
I.D.	t	METHOD 3B			METHOD 3C			METHOD 3B			METHOD 3C			METHOD 3B		METHOD 3C	
IN INCHES		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Asi	Aso
24	1 7/8	.05	—	—	.04	—	—	.11	—	—	.10	—	—	.19	—	.14	—
30	2 1/8	.07	—	—	.05	—	—	.13	—	—	.12	—	—	.21	—	.17	—
36	2 3/8	.07	.05	.07	.06	.04	06	.15	.10	.15	.12	.08	.12	.22	.15	.17	.12
42	2 1/2	.09	.06	.10	.07	.05	08	.19	.13	.20	.15	.10	.16	.32	.22	.23	.17
48	2 5/8	.11	.08	.12	.09	.07	.10	.24	.17	.26	.18	.14	.20	.36	.29	.30	.23
54	2 7/8	.13	.09	.14	.10	.07	.11	.26	.19	.28	.20	.15	.21	.42	.32	.32	.25
60	3 1/2	.11	.08	.12	.09	.06	.10	.23	.16	.25	.18	.13	.19	.36	.26	.27	.20
66	3 3/4	.13	.09	.14	.10	.07	.11	.25	.18	.27	.19	.14	.21	.40	.29	.30	.23
72	4 1/4	.13	.09	.14	.10	.07	.11	.25	.17	.28	.19	.14	.21	.39	.28	.30	.22
78	4 3/4	.13	.09	.14	.10	.07	.11	.25	.17	.28	.20	.14	.21	.39	.27	.30	.22
84	5 1/4	.15	.10	.15	.11	.07	.12	.26	.17	.28	.20	.14	.22	.39	.27	.30	.22
90	5 3/4	.15	.10	.17	.12	.09	.13	.29	.20	.32	.23	.16	.25	.44	.31	.34	.25
96	6	.17	.11	.17	.12	.08	.15	.29	.20	.32	.22	.16	.24	.44	.30	.33	.24
102	6 1/2	.18	.12	.19	.14	.10	.15	.32	.22	.35	.26	.18	.28	.49	.34	.38	.28
108	7	.19	.13	.20	.15	.10	.16	.33	.23	.36	.27	.19	.29	.50	.35	.39	.29

CONSTRUCTION NOTES

1. For details of the method of excavation, backfill and bedding (Method 1, Method 2, etc.), see Standard Plan A62-D, "Excavation and Backfill Details, Concrete Pipe Culverts".
2. The tables for minimum allowable classes and D-loads of RCP on Standard Plan A62-D shall not apply to direct design RCP.
3. Notes 7, 8 and 9 on Standard Plan A62-D shall apply to direct design RCP.
4. Throughout the length of any given culvert, the direct design selected by the Contractor shall be the same, including the method of excavation, backfill and bedding.
5. The embankment height prior to excavation specified in note 3 of Standard Plan A62-D shall apply to the direct design RCP installation when Method 2, 3A or 3B are used.
6. For wall thickness (t) less than 2 1/2 inches, the minimum clearance (clr) for reinforcement shall be 3/4 inch, and for wall thickness (t) of 2 1/2 inches or more the minimum clearance (clr) for reinforcement shall be 1 inch.

DESIGN NOTES

Design: Bridge Design Specifications (1983 AASHTO with Interims and revisions by Caltrans).

A. Earth Loading:
Earth Densities - Vertical: 140 lbs./cu. ft.
Horizontal: Varies, see design lateral pressure chart (Circular Pipe only).

B. Unit Stresses: (Used in Design Tables)
fy = 65,000 psi
f'c = See Tables

C. Direct design method circular RCP is not intended to be used in corrosive environment.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PRECAST REINFORCED CONCRETE PIPE DIRECT DESIGN METHOD

NSP D79

NSP D79

(Completely revised to include Direct Design Method RCP.)
(New Standard Plan NSP D79 entitled "Precast Reinforced Concrete Pipe, Direct Design Method" must be included in the plans.)
(Include SSP Mtls-C1 in the project.)
(When location of RCP is in a corrosive environment refer to Design Manual for instructions.)
(DO NOT EDIT PARAS. 3 THROUGH 5.)

65.01
1-17-89

10-1._____ REINFORCED CONCRETE PIPE.--Reinforced concrete pipe shall conform to the provisions in Section 65, "Reinforced Concrete Pipe," of the Standard Specifications and these special provisions.

2

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

3

Circular reinforced concrete pipe shall be, at the option of the Contractor, either reinforced concrete pipe conforming to Section 65-1.02A, "Circular Reinforced Concrete Pipe," of the Standard Specifications or circular reinforced concrete pipe manufactured in accordance with the requirements of the direct design method of these special provisions.

4

DIRECT DESIGN METHOD PIPE.--Direct design method circular reinforced concrete pipe shall be of the wall thickness and reinforcement, selected by the Contractor in accordance with the details for direct design method pipe shown on the plans and the following requirements:

4a

Direct design method pipe shall be installed in accordance with the method of excavation, bedding and backfill shown on the plans and designated for the particular pipe design selected by the Contractor.

4b

Direct design method pipe shall conform to the specifications of AASHTO Designation: M 170 except as shown on the plans or provided in these special provisions.

4c

The 3-edge bearing test shall not apply to direct design method pipe.

4d

The wall thickness of "Wall X" circular reinforced concrete pipe shall not vary more than 1/4 inch from the wall thickness shown on the plans.

4e

SHOP PLANS.--Shop plans conforming to Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications shall be submitted to the Engineer for approval. For initial review, 3 sets shall be submitted to the Office of Structures Design, Documents Unit, P.O. Box 942874, Sacramento, CA 94274-0001. After review, 6 sets shall be submitted to the said Office for final approval and for use during construction.

4f

Shop plans shall include the wall thickness; type, size, location, and configuration of the reinforcement; and a list of station locations for the pipes, including the size, wall type, maximum height of cover, and method of excavation, bedding and backfill for each location.

4g

CONCRETE.--The Contractor shall determine the mix proportions for all concrete to be used in direct design method pipe. Before using concrete or in advance of revising approved mix proportions the Contractor shall submit in writing a copy of the concrete mix design to the Engineer for approval.

4h

Concrete shall be designated by compressive strength as specified in Section 90-1, "General," of the Standard Specifications and shall be prequalified in accordance with Section 90-9, "Compressive Strength," of the Standard Specifications.

4i

Concrete shall be sampled and tested for compressive strength by the Contractor, at his expense, at least once every production shift, but not less often than once daily.

4j

REINFORCEMENT.--The circumferential reinforcement for circular reinforced concrete pipe shown on the plans shall be smooth or deformed reinforcement with a specified minimum yield strength of 65,000 psi with longitudinal reinforcement welded thereto at not more than 8 inches maximum spacing.

4k

Splices of circumferential reinforcement shall develop at least a strength equal to Awr Fy, where Awr = required area of reinforcement shown on the plans and Fy = specified yield strength of reinforcement.

4l

Spacers or stirrups may be welded to the longitudinal reinforcement. Welding of spacers or stirrups will be allowed on not more than 10 percent of the circumferential reinforcement at not less than 24-inch spacing along the pipe length. Where spacers or stirrups are welded to circumferential reinforcement in excess of the above requirements or where longitudinals are welded to circumferential reinforcement, the strength of the circumferential reinforcement across the finished welds shall be not less than 1.1 Awr Fy.

4m

Additional reinforcement required for handling and installation stresses shall be determined, furnished and placed by the Contractor at his expense.

4n

MARKINGS.--Markings for direct design method circular reinforced concrete pipe shall be as required by AASHTO Designation: M 170 except that marking for class of pipe will not be required for such pipe. The markings required by AASHTO Designation: M 170 shall be supplemented by the following: contract number, maximum height of cover, method of excavation, bedding and backfill for the pipe.

4o

CERTIFICATE OF COMPLIANCE.--The Contractor shall furnish to the Engineer a Certificate of Compliance from the manufacturer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each pipe shipment. The certificate shall be signed by the manufacturer's quality control representative and shall state that all materials and workmanship comply in all respects with the specifications and approved shop plans.

4p

MODIFIED OR SPECIAL DESIGNS.--Modified designs are the designs which differ from the direct designs shown on the plans with respect to the reinforcement only. Special designs are the designs which differ in any respect from those shown on the plans. Modified or special designs for direct design method pipe shall be submitted to the Engineer for approval in accordance with Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications.

4q

Modified or special designs shall be designed according to the California Department of Transportation Bridge Design Specifications.

4r

The Contractor shall submit proof of the adequacy of the proposed modified or special design. The adequacy of modified or special designs, based upon conformance with crack requirements and structural design parameters, will be as determined by the Engineer.

4s

Modified designs shall not change the clear coverage from the surface of the concrete to the outside of the reinforcement nor the thickness of the pipe barrel wall shown on the plans.

4t

The Department will not be liable to the Contractor for failure to accept any modified or special design submitted by the Contractor.

5

Full compensation for any delay or inconvenience in connection with furnishing direct design method reinforced concrete pipe or modified or special design method reinforced concrete pipe shall be considered as included in the contract price paid per linear foot for the size of reinforced concrete pipe involved and no additional compensation will be allowed therefor.

JANUARY 1988 STANDARD PLANS BOOK

Revisions and Additions as of December 16, 1988

Date	Plan No.	Title
07-05-88	RSP D87-C	Underdrains
10-31-88	RSP T-12	Traffic Control System For Lane Closure On Multilane Conventional Highways
12-16-88	NSP D79	Precast Reinforced Concrete Pipe Direct Design Method