Index

Revised April, 2009

A

AASHTO
- bikeway guide 1.1.2.9
- deck design..... 1.1.20.1
- design manuals..... 1.1.1
- design standards 1.1.1, 1.1.10.1
- ODOT design instructions LRFD 1.6
- pedestrian bridges 1.1.7.2
- protective fence 1.4.4.5
- rail design 1.1.21.1, 1.1.21.2
- restrainer design 1.1.11.2
- seismic design 1.1.9.5, 1.1.10.1
- soundwall design 1.5.2.1
- temporary works 1.4.9.1
- timber design 1.3.2

Abbreviations
- general.....Appendix 1 & 2

Abutments
- beam seat drainage 1.1.8.11
- bent width provisions 1.1.8.13
- details for prestressed slabs (Fig)..... Appendix 1
- details for slabs 1.1.8.7
- foundation design 1.1.4.2
- integral 1.1.8.4
- general..... 1.1.8
- numbering..... 2.6.1
- options 1.1.8
- pile cap details 1.1.8.7
- plan view..... 2.6.1, 2.7.3.1
- post-tensioned backwalls..... 1.1.8.10
- seismic design 1.1.4.2, 1.1.10.2
- showing groundline..... 2.7.7.1
- strutted..... 1.1.8.5
- substructure choices..... 1.1.2.5
- wingwall construction..... 1.1.8.3

Access
- bearing replacement 1.1.19.3
- bottom slab 1.4.4.4
- concrete box girders 1.4.4.4
- cross beam 1.4.4.4
- deck plan 2.7.5
- form removal..... 1.1.14.2, 1.1.15.11
- girder stem..... 1.4.4.4
- hole cover 1.4.4.4
- holes 1.1.15.6, 1.4.4.4
- inspection..... 1.4.4.2
- plan view..... 2.6.1
- sign structure 1.4.4.4
- snooper..... 1.4.4.2
- standard details 1.4.4.4
- utilities..... 1.4.7.1
- ventilation..... 1.1.16.2

Access holes
- concrete box girders.....1.4.4.4
- deck plan details 2.7.6

Accessibility
- general 1.4.4.4

Admixture
- epoxy concrete 1.1.20.5
- flexible polymer concrete.....1.1.20.5
- LMC, MC 1.1.20.5

ADT
- deck overlays 1.1.20.5
- rail selection 1.1.21.1
- timber bridge locations 1.3.1

Aesthetics
- concrete piling 1.1.5.4
- conflicts 1.1.2.9
- general 1.1.2.9
- guidelines 1.1.2.9
- structure layout.....1.1.2.3

Aggregate
- column design 1.1.9.4
- epoxy concrete 1.1.20.5
- general 1.1.12.1
- flexible polymer concrete.....1.1.20.5

Alignment
- footing plan.....2.7.5
- horizontal.....2.7.3.1
- microstation models 2.1.2.1
- on plans.....2.6.1, 2.7.5, 2.7.6
- roadway geometry.....1.1.2.1
- utility holes.....1.4.7.3

Alternate
- bridge length.....1.1.2.2
- designs.....1.1.2.10
- steel design 1.1.2.4
- structure types.....1.1.2.4
- timber railing.....1.3.4
- timber structures.....1.3.4
- widening 1.1.15.10

Anchor
bolts 1.1.2.4
drilled 1.1.22, 1.1.23
piles 1.1.5.4
resin bonded (EQ restrainer) 1.1.11.2
resin bonded 1.1.23

Anchor bolts
bearing seat 1.1.19.4
bent details 1.1.23.3
design chart (Fig) 1.1.23.2
general 1.1.23.1, 1.1.24
plan view 2.7.7.2
materials 1.1.24.1
sleeves 1.1.24.1
steel beams 1.2.1.1

Anchor rods
materials 1.1.23.1
tensioning 1.1.24.1

Anchorage
backwall reinforcing 1.1.24.1

Anchors
drilled concrete 1.1.23
materials 1.1.23.1
mechanical 1.4.7.5
resin bonded concrete 1.1.23

Approach
concrete walk 1.1.2.7, 1.1.8.12
rail 1.1.2.7, 1.1.21.2
roadway 1.4.8.1
slab 1.1.2.7
slab (utilities) 1.4.7.3
wearing surface 1.1.2.7, 1.1.7.1

Architecture
columns 1.1.9.8
rails 1.1.21.1

Archiving drawings
general 2.10

As constructed
deck overlay 1.1.20.5
revisions 2.7.2, 2.7.11

Asphalt
concrete wearing surface 1.1.25.4, 1.3.2
deck overlays 1.1.20.5
deck preparation 1.1.20.5
end panels 1.1.2.7
plug joint 1.1.21.3

ASTM
anchor bolts 1.1.23.1
cable 1.1.11.2, 1.2.5.1
epoxy concrete 1.1.20.5
general notes A2.7.3
joint seal 1.1.20.2
metric conversion 1.6
restrainer cable 1.1.11.2
spiral reinforcement 1.1.9.6
std. bar data 1.1.9.6, 1.1.13.1
structural steel 1.2.1.1, 1.5.6.4
wire rope A1.2.5

Attachments to existing structures
general 1.4.7.5

Attenuators
chevrons 1.4.3.2
design 1.4.3.1

Average daily traffic
deck overlays 1.1.20.5
timber bridge locations 1.3.1

B

Backfill
cofferdams 1.1.3.3
earth restraint 1.1.3.2
strutted abutments 1.1.8.5
translational stiffness 1.1.4.2
wingwalls 1.1.8.3

Barrier
approach rail 1.1.2.7
column protection 1.1.2.3
deck overlays 1.1.20.5
in front of walls 1.4.8.1
on wingwalls 1.1.2.7
protective fence 1.4.4.5
rail selection 1.1.21.1
soundwall 1.4.2.1
temporary 1.1.21.4
utilities 1.4.7.4

Batter
Piling (seismic modeling) 1.1.4.1, 1.1.4.2

Beam camber
general 1.1.17
prestressed 1.1.14.1, 1.1.17.2
steel 1.2.1.8

Beam seat
drainage 1.1.8.11
elevations 1.1.14.2

Beams
aesthetics 1.1.2.8
aggregate size 1.1.9.5, 1.1.12.1
CIP girders 1.1.15, 1.1.14.2
deck plan 2.7.6
diaphragm(details) 1.1.13.5, 2.7.7.3
dimensioning 2.2.3
glued laminated 1.3.2
interim reinforcement 1.1.13.2, 1.1.15.2
longitudinal views 2.7.7.1, 2.7.7.4
plan view 2.7.7.2
precast(general notes) A2.7.3
prestressed 1.1.14.2
steel 1.2.1
stirrups 1.1.14.2
superstructure sections 2.7.7.2
timber 1.3.2

Bearing
clearances 1.1.19.1, 1.1.19.2
concrete pad 1.1.19.4
cotton duck pad (restrictions) 1.1.19.1, 1.1.19.5
deck plan 2.7.6
dynamic isolation 1.1.10.9
elastomeric 1.1.19.1
expansion 1.1.19
expansion schedule 1.1.19.2
foundation pressure 1.1.3.1, 1.1.4.2
hold-downs 1.1.11.5
misc. details 2.7.8
pedestals 1.1.19.2
pile capacity 1.1.5.4
proprietary 1.1.19.2
reinforced seat 1.1.19.4
replacement 1.1.19.3
restrainer 1.1.11
schematic (Fig) 1.1.19.2
soil capacity 2.7.3.2, 2.7.4
stiffeners 1.2.1.5
underwater soil 1.1.6.1

Bearing stiffeners
general 1.2.1.5

Bending
bents 1.1.8.3
cables 1.2.5.1
glulam timbers 1.3.2
pile capacity 1.1.5.5

Bending radius
cable 1.2.5.1, A1.2.5
wire rope 1.2.5.1, A1.2.5

Bents
bearing replacement 1.1.19.3
deck plan detailing 2.7.6
deck screeding 1.1.20.4
deck steel placement 2.7.6
detailing practices 2.7.8
drawing scales 2.1.6
end 1.1.8
interior 1.1.9
joint details 1.1.8.9
naming and numbering 2.6.1
on MSE walls 1.1.8.4
pour schedules 1.1.8.4, 2.7.3.1
rail selection 1.1.21.1
riprap 1.1.3.1
seismic modeling 1.1.4
strutted 1.1.8.5
substructure choices 1.1.2.5
superstructure restrainer design 1.1.11
trestle pile 1.1.4.1
width provisions for precast units 1.1.8.13
wingwall construction 1.1.8.3
wingwalls 1.1.8.2

Berm
soundwalls 1.4.2

Bicycle
design 1.1.1
loads 1.1.7.2
protective screening 1.4.4.5
rail selection 1.1.21.1
traffic 1.1.2.9
traffic handling 1.1.2.9

Bikeway
allocation 1.1.2.9
concrete finish 1.1.12.2
protective screening 1.4.4.5
width 1.4.8.1

Biological Assessment
TS&L narrative 1.1.2.11

Blast
sand 1.1.20.5
shot 1.1.20.5, 1.2.1.3
water 1.1.20.5

Blockout
anchor bolts 1.1.24.2
expansion joint 1.1.20.2, 1.2.1.10
utility 1.4.7.3

Bolted
bearing plates 1.1.19.2
connections 1.2.6
cross frames 1.2.1.3
field splices (steel) 1.2.1

Bolting
Anchor bolts 1.1.24.2
cable connections A1.2.5
cross frames 1.2.1.3
girder flanges 1.2.1
gusset plates 1.2.1.3
stiffeners 1.2.1.5

Bolts
anchor 1.1.24, 1.2.3, 2.7.7.2
bearing installation 1.1.19.2
concrete inserts 1.4.7.3
galvanized 1.4.7.3
general 1.2.6
General Notes A2.7.3
high strength 1.2.6.1
resin bonded 1.1.23
restrainer 1.1.11.2, 1.1.23.2
sleeves 1.1.24.2
utility 1.4.7.3

Bottom flange
concrete fillets 1.1.15.9
general (steel) 1.2.1
stiffener connections 1.2.1.3

Bottom slab
access holes 1.1.15.6
construction joints 1.1.16.8, 1.1.18.1
deck form support 1.4.4.3
detailing access 2.7.5
details 1.1.15.7
pour schedule 1.1.18
ventilation holes 1.4.4.4

Bouyant
seal weight 1.4.9.6

Box beams
camber 1.1.17.2
corrosion protection 1.1.25.3
detailing 1.1.14.1

Box culvert
rails over 1.1.21.1

Box girders
access 1.1.15.6
access holes 1.1.15.6
deck plan details 2.6.1, 2.7.6
design 1.1.15.1, 1.1.16.1
detailing 1.1.15.7, 2.6.1, 2.7.6
falsework 1.1.18.3
form removal 1.4.4.3
gas lines 1.4.7.4
interim reinforcement 1.1.13.3
post-tensioned 1.1.16
skewed design 1.1.16.1
structure depth 1.1.15.1
structure type 1.1.2.4
utilities 1.4.7.4
ventilation 1.4.4.4
water lines 1.4.7.4

Bracing
cofferdams 1.4.9.6
cross frames 1.2.1.3
details 1.2.1
gusset plates..... 1.2.1.3
temporary..... 1.2.1.2

Bracket
details 1.4.7.3, 1.4.7.6
overhang..... 1.2.1
utilities..... 1.4.7.1

Breaking strength
cable, wire rope 1.1.11.2, 1.2.5.2
safety cable.....A1.2.5
turnbuckles A1.2.5

Bridge
Log - bridge names..... 2.4.1
ID Paddles .....1.1.2.9(9)
name plates - existing..... 1.4.6
manuals, maintenance / service 1.1.2.12

Bridge numbers
requesting 2.4.1

Bridges
large or unusual 1.1.2.4, 1.1.2.10
strengthening, permanent - concrete..... 1.1.12.5

Buildings under ODOT bridges
general..... 1.4.10

Butt weld
flange splices..... 1.2.1, 1.2.1.1

C

Cable
bending radius.....1.2.5.1
CalTrans.....1.2.5.1
commentary..... A1.2.5
elastic modulus 1.2.5.5
general 1.2.5.1, 1.2.5.2
recommended sizes 1.2.5.1
restrainer 1.1.11.2
safety.....1.2.5.1
seismic retrofit 1.2.5.1
special provisions..... 1.1.11.6, 1.2.5.3
stockpile 1.1.11.6
yield strength 1.1.11.2

CAD
Archiving files 2.10
cell libraries 2.1.3
detailing.....2.2
directory setup.....2.1.1
drawing identification tag.....2.3.1
drawing scales.....2.1.6
files 2.1.2
menus.....2.1.4
microstation models 2.1.2
revisions 2.7.10
scales 2.1.6
seed files 2.1.5
tutorials.....2.1.4

Calculation books
final design 1.1.2.12

Calculations
design.....1.1.2.12
example rail selection.....1.1.21.1
footing stiffness 1.1.4.2
rod elongation.....1.1.11.2
scour.....1.1.6.1
utility connections 1.4.7.1

Camber
beam seat adjustment.....1.1.14.2
concrete beams.....1.1.15
diagram (detailing).....2.7.7.3
diagrams.....1.1.17
p/s slabs 1.1.14.1, 1.1.17.2
shrinkage.....1.2.1.8
steel beams 1.2.1.8

Cantilever
beam reinforcing 1.1.13.1
dynamic isolators 1.1.10.9
glulam timber 1.3.2
support towers 1.1.16.6
wingwall 1.1.8.3

Cast-in-place
box girder 1.1.2.4, 1.1.15, 1.1.16
camber diagrams 1.1.17.1
end bents 1.1.8.7
decks 1.1.20
deflections 1.1.16.1
minimum cover 1.1.25.2
slabs 1.1.2.4, 1.1.18.5
shortening 1.1.16.1
superstructure 1.1.15, 1.1.16
widenings 1.1.15.10

Catch basins
deck drainage 1.1.20.3
plan details 2.6.1, 2.7.3, 2.7.6

Cathodic
protection 1.1.25.2

Catwalk
inspection 1.4.4.2

Cement
high-early strength 1.1.20.5

Chain link
fence 1.1.21.1, 1.4.4.5

Chamfer
segmental construction 1.1.16.5

Changes
as constructed 2.7.11
final plans 2.7.2
revisions 2.7.11

Check List
rail selection 1.1.21.2

Check prints
plotting prints 2.8.1

Checker
final design 1.1.2.12
seismic design 1.1.10.4

Checking
drilled shaft 1.1.4.3
final design 1.1.2.12
roadway width 1.4.8.1
soil bearing 1.1.4.2
turnbuckle clearances A1.2.5

Chevrons
general 1.4.3.2

Clear zone
columns 1.1.2.3

Clearance
bearing seat 1.1.19.4
bearing seats 1.1.19.5
cast-in-place decks 1.1.25.3
column steel in footing 1.1.9.7
construction 2.7.3.9
cross frames 1.2.1.3
diagrams 2.6.3
glulam longitudinal deck 1.3.2
inspection walks 1.4.4.2
proprietary bearings 1.1.19.2
railroad 1.4.8.2, 2.7.3.8
reinforcing steel 1.1.13.1
roadway 1.4.8.1
seismic design 1.1.10.1
shear reinforcing 1.1.13.4
structure 1.1.2.1, 1.4.8

Clearances
buildings 1.4.10
railroad 1.4.8.2, 2.7.3.8
roadway 1.4.8.1
stock paths 1.1.2.2
structure layout 1.1.2.2
structure types 1.1.2.3, 1.1.2.4
vertical (detailing) 2.6.3
waterway 1.1.2.2

Closure pour
deck screeding 1.1.20.4
end bents 1.1.8.3
pour schedules 1.1.18.1
widenings 1.1.14.2, 1.1.15.10, 1.2.1.12

Coating
cables 1.2.5.1, 1.2.5.3, A1.2.5
epoxy 1.1.25.2, 1.1.25.3
existing epoxy 1.1.20.5
galvanized 1.2.4.3
girder ends 1.2.1.10
new or existing metal 1.2.4.4
prestressing strands 1.1.25.2
recoating existing metal 1.2.4.5
spiral reinforcement 1.1.9.6
turnbuckles A1.2.5
weathering steel 1.2.1.1
wire rope 1.2.5.1
zinc 1.2.4, 1.2.5

Cofferdam
details 1.4.9.6
equal water level 1.4.9.6
flooded 1.4.9.6
foundation requirements 1.1.3.3
resource protection 1.1.2.9
scour 1.4.9.6
seal design 1.4.9.6
size 1.1.6.1
underwater construction 1.1.6.1
water removal 1.1.6.1, 1.4.9.6

Collision posts
clearance diagram 2.7.3.8

Column
aesthetics 1.1.2.9
category B,C and D 1.1.10.2
concentric reinforcement 1.1.9.5
concrete aggregate size 1.1.9.5
concrete(general notes) A2.7.3
design, general 1.1.9.5
detailing 1.1.9.1, 2.7.7.3
drain pipe 1.1.9.5, 1.1.20.3
effect on span 1.1.9.1
hoops 1.1.9.8
hoops at base (Fig) 1.1.9.10
hoops at bottom 1.1.9.10
in cofferdams 1.4.9.6
in median 1.1.2.3
in slopes 1.1.9.4
locations 1.1.2.3
non-circular 1.1.9.5

Column - continued
p/s piles as 1.1.5.5
plastic hinging 1.1.10.2
pour schedule 1.1.18.4
reinforcement in footings (Fig) 1.1.9.11
restrainer design 1.1.11
seismic considerations 1.1.9.5, 1.1.10.1
seismic (general notes) A2.7.3
single column modeling 1.1.10, 1.1.11
sloped footings 1.1.9.12
spiral reinforcement 1.1.9.6
steel clearance in footings 1.1.9.7
steel fabrication A2.7.3
stiffeners as 1.2.1.5
top-pinned 1.1.9.5
vehicular collision force 1.6
vertical bar spacing 1.1.9.9
vertical bar splice (Fig) 1.1.9.9
widenings 1.1.10.1

Composite
delayed diaphragm pour 1.14.2
flexible polymer 1.1.20.5
load deflection curves 1.1.4.2
rail action 1.1.21.1
wood-concrete 1.3.2

Composite girders
negative moment areas 1.2.1.7
shrinkage camber 1.2.1.8

Compressible filler
utility holes 1.4.7.3

Compression
butt weld splices 1.2.2.3
pile axial 1.1.4.2
seals 1.1.20.2

Compression flanges
general 1.2.1
stiffeners 1.2.1.3

Computer
CAD 2.1
foundation modeling 1.1.4
seismic analysis 1.1.10.4
steel design programs 1.2.1
text 2.2.1

Concrete
aesthetics 1.1.2.9
ACWS on end panel 1.1.2.7
anchors 1.1.23
anchor bolts 1.1.23.1, 1.1.24
barrier, approach 1.1.2.7
bearing pad construction 1.1.19.4
bearing seat 1.1.19.4
bearing strength 1.1.11.2
bearings for 1.1.19.1, 1.1.19.2
bonding agents 1.1.12.3
box girders 1.1.15, 1.1.16
cast-in-place decks 1.1.20
classes 1.1.12.1
closure pour ..... 1.1.8.3, 1.1.14..2
coloring 1.1.2.9, 1.1.12.2
compressive strength 1.1.12.1
confinement 1.1.9.8
construction joints 1.1.15.6, 1.1.20.6
core footing 1.1.9.10
cover 1.1.13.1
cracking control, decks 1.1.20.1
creep 1.1.7.1, 1.1.11.3, 1.1.14.1, 1.1.16.1
cross beam 1.1.15.8
curing 1.1.12.4
dead load camber 1.1.17.1
deck 1.1.20, 1.1.25.3
deck screeding 1.1.20.4
deck (general notes) A2.7.3
detailing 2.2.4, 2.7.7
dimensioning 2.2.3
drilled anchors 1.1.23
drilling holes in 1.1.22
elastomeric nosings 1.1.20.5
end panels 1.1.2.7, 1.1.8.12
epoxy overlay 1.1.20.5
expansion joint setting 1.1.20.2
finish ..... (1.1.2.9), 1.1.12.2
flexible polymer 1.1.20.5
friction against piling 1.4.9.6
general 1.1.12
in restrainer design 1.1.12
inserts 1.1.11.2, 1.4.7.3
interim reinforcement 1.1.13.3
joint fillers 1.1.20.2
latex modified 1.1.20.5
LMC depth limitations 1.1.20.5
low porosity 1.1.25.3
membranes 1.1.25.4
metric conversion 1.5
microsilica 1.1.20.5, 1.1.25.2
modulus 1.1.12.1
overlay dead load 1.1.20.5
overlay quantity 1.1.20.5
overlay scheduling 1.1.20.1
overlays 1.1.20.5
p/s elements 1.1.14.1
pile 1.1.5.4
pile cap 1.1.8.7
placement around reinforcing 1.1.9.10
placement slope 1.1.8.3
post-tensioned (general notes) A2.7.3

Concrete - continued
pour schedule 2.7.9, 1.1.18
precast members 1.1.14
pump placement 1.4.9.6
rails 1.1.21
rails, drainage 1.1.20.3
rebar clearance (general notes) A2.7.3
reinforcement 1.1.13
repair 1.1.12.3
saved w/ sloped footings 1.1.9.12
seal 1.4.9.6
seal placement 1.4.9.6
sealers 1.1.20.5, 1.1.25.3
segmental construction 1.1.16.5
shear lugs 1.1.11.2
shortening, p/t 1.1.16.1
shrinkage 1.1.9.3
shrinkage loading 1.1.15.1, 1.1.16.1, 1.2.1.8
strength 1.1.12.1
strengthening, permanent 1.1.12.5
strength in cofferdams 1.4.9.6
strength in precast 1.1.14.1
structure types 1.1.2.4
surface finish 1.1.12.2, 2.7.9
tremie placement 1.4.9.6
vibration (deck placement) 1.1.20.1
wingwall construction 1.1.8.3

Conduit
Electrical (plan detailing) 2.7.6
encased in concrete 1.4.7.2
expansion joint 1.1.20.2
external 1.4.7.1

Connections
approach rail 1.1.21.2
bent widenings 1.1.9.3
bolted 1.2.6
cables 1.2.5
concrete anchors 1.1.22, 1.1.23
crossbeam details 1.1.9.3
friction type 1.2.6
longitudinal restrainers 1.1.11
mechanical 1.1.13.1
post to deck 1.1.21.1
restrainer design 1.1.11
seismic forces 1.1.10.1
seismic retrofit 1.1.10.1
seismic(general notes) A2.7.3
slip-critical 1.2.6
soundwalls 1.4.2
structure widenings 1.1.9.3, 1.1.14.2, 1.1.15.10
timber 1.3.3
turnbuckles 1.2.5
utilities 1.4.7.1
welded 1.1.13.1

Construction
accelerated bridge construction (ABC) .. 1.1.2.9(10)
anchors 1.1.23.3
bearing pad 1.1.19.5
clearance 1.4.8.1, 1.4.8.2
cofferdam 1.4.9.6
concrete finish 1.1.2.2
connection tolerances 1.3.3
deck 1.1.14.2
deck overlay 1.1.20.5
dynamic isolators 1.1.10.9
end bents 1.1.18.6
general notes A2.7.3
interior bent 1.1.9
joint 1.1.12.3, 1.1.13.3, 1.1.18.5
joint at deck 1.1.20.6
lateral earth restraint 1.1.3.2
LMC 1.1.20.5
MC 1.1.20.5
of cables 1.2.5.3
of turnbuckles 1.2.5.3
polymer concrete 1.1.20.5
pour schedules 1.1.18
revisions 2.7.10
schedule 1.1.2.12
scheduling for overlay 1.1.20.5
seal 1.1.6
segmental 1.1.16.5
sequence 1.4.9.6, 1.1.8.3, 1.1.9.4, 1.1.18.1
shear keys 1.1.15.5
stage 1.2.1.3
stay-in-place forms 1.1.15.10
temporary 1.4.9.1
timber(general notes) A2.7.3
TP & DT/ Stage 1.1.20.5
underwater 1.1.6.1
widenings 1.1.15.10, 1.2.1.12
wingwall 1.1.8.3

Construction costs
added for seismic 1.1.10.7

Consultants
transfer of electronic files 2.9

Continuous
bottom slab 1.1.18.3
bridges (types) 1.1.2.4, 1.1.15.1
cofferdam pumping 1.4.9.6
concrete slabs 1.1.18.5
deck reinforcement 1.1.13.5, 1.1.14.2
deck, restrainer 1.1.11.3
segmental construction 1.1.16.5
spans, pour schedule 1.1.18.1
steel span bridges 1.1.2.4
superstructure, restrainer 1.1.11.3
beam, reinforcement 1.1.13.1

Continuous spans
deck joints 1.1.20.6
deck pouring 1.1.18.1, 1.1.18.3, 1.2.1.9
glulam longitudinal deck 1.3.2
shear connectors 1.2.1.7
structure types 1.1.2.4

Contract
plans, bearings 1.1.19.2
plans, concrete finish 1.1.12.2
plans, P/S slab 1.1.17.2
scheduling committee 1.1.20.5
time (overlays) 1.1.20.5

Contract plans
bearings 1.1.19.2
concrete finish 1.1.12.2
existing structure plans 2.4.2, 2.6.1, 2.7.3.1
metric conversion 1.5.5
precast cambers 1.1.17.2
standard drawings 2.4.2, 2.7.1
steel cambers 1.2.1.8
steel girders 1.2.1.1

Contractor
bridge name plates 1.4.6.1
cable availability 1.1.11.6
cofferdam changes 1.4.9.6
constructability 1.1.9.1
formwork removal 1.1.6.1
lateral earth restraint 1.1.3.2
overlay experience 1.1.20.5
pour schedules 1.1.18.1
shoring 1.4.9.3
staged construction 1.1.18.6
traffic handling 1.1.2.9
underwater falsework 1.1.6.1
welding 1.2.2.1
wingwall construction 1.1.8.3

Cope
gusset plates 1.2.1.3

Corbel
end panel 1.1.20.5

Corrosion protection
attachments to structures 1.4.7.4
bearings 1.1.19.1
cables 1.2.5.1
galvanizing 1.2.4
gas lines 1.4.7.4
general 1.1.25
marine environment 1.1.25.1, 1.1.25.2
overlay warrants 1.1.20.5
piling 1.1.5.5
silicon control 1.2.4.3
Specialist 1.1.25.1
waterproofing membrane 1.1.25.4
weathering steel 1.2.1.1

Cost
added seismic 1.1.10.7
bearings 1.2.1.11
bridge length 1.1.8.1
deck preparation 1.1.20.5
LMC overlay 1.1.20.5
overlay 1.1.20.5
overlay design criteria 1.1.20.5
phase 2 seismic retrofit 1.1.10.1
rail retrofit 1.1.21.2
rail upgrade 1.1.21.2
retrofit cable 1.1.11.6
steel girders 1.2.1
structure types 1.1.2.4
TP & DT (overlay) 1.1.20.5

Cost Data
deck overlay 1.1.20.5
structures 1.1.2.4

County
Location map 2.6.2
membrane policy 1.1.25.4
roadway width 1.1.2.2

County Bridge Number
title block details 2.4.2

County Name
title block details 2.4.2

Cover
access hole 1.1.15.6, 1.4.4.4
bearing 1.1.19.1
cast-in-place decks 1.1.25.3
column, minimum 1.1.9.5
deck steel 1.1.13.1, 1.1.25.3
marine environment 1.1.25.2
over spread footings 1.1.3.1
plates 1.1.5.4

Crash cushion
design 1.4.3

Crash test
approach rails 1.1.21.1
culvert rail 1.1.21.1
curb height 1.4.8.1
deficient rails 1.1.21.2
new rail designs 1.1.21.1
rail table 1.1.21.1
rails 1.1.21.1
single tube rail 1.1.21.1
two tube rail 1.1.21.1
timber rail 1.1.21.1
type "F" rail 1.1.21.1
type 2A guard rail 1.1.21.1
untested retrofit designs 1.1.21.2

Creep
anchor bolts 1.1.24.1
bearing pads 1.1.19.1, 1.1.19.2
camber diagrams 1.1.17.1
deck (joints) 1.1.20.2
elastic effect 1.1.16.1, 1.1.17.1
encasing end beams 1.1.14.1
expansion joint setting 1.1.20.2
joint openings 1.1.20.2
post-tension 1.1.16.1
proprietary bearings 1.1.19.2
restrainer design 1.1.11.3

Cross frames
and utilities 1.4.7.3
general 1.2.1.3, 1.2.1.4, 1.2.1.6

Crossbeam
access holes 1.1.15.6, 1.4.4.4
additional shear reinforcement 1.1.13.4
aesthetics..... 1.1.2.9
beam seat 1.1.14.2
bearing replacement 1.1.19.2
column reinforcing 1.1.9.6
concrete aggregate 1.1.9.5
deck plan detailing 2.7.5
detailing 2.2.4
effective span..... 1.1.9.1
extending reinforcing 1.1.13.1
interim reinforcing 1.1.13.3
plastic capacity 1.1.9.6, 1.1.10.2, 1.1.10.3
superstructure detailing 2.7.7.3
transverse restrainer 1.1.11.4
width provisions 1.1.8.3

Cultural Resources
protection 1.1.2.9

Culvert
design 1.4.5
rails over 1.1.21.1

Culvert pipe
for utilities..... 1.4.7.3

Culverts
hydraulic data detailing 2.7.3.3
utilities..... 1.1.2.9, 1.4.7.3

Curb
and attenuator design 1.4.3
deck drainage 1.1.20.3
epoxy coated bars..... 1.1.25.3
height 1.1.21.1, 1.4.8.1
joints 1.1.21.3
on p/s slabs..... 1.1.17.2
pour schedule 1.1.18.4
presence and location..... 1.1.21.2
rails on 1.1.21.1
reinforcing cover 1.1.13.1
retrofit rails 1.1.21.2
sidewalk 1.1.21.1
superstructure detailing 2.7.6, 2.7.7.2
two-tube rail 1.1.21.1

Cure
epoxy concrete 1.1.20.5
LMC placement 1.1.20.5
overlay scheduling.....1.1.20.5
overlay time 1.1.20.5
polymer concrete.....1.1.20.5
unreinforced bearing seat.....1.1.19.5

Curing
concrete.....1.1.12.4
LMC.....1.1.20.5
polymer concrete.....1.1.20.5

Curve
bent intersection dimensioning.....2.7.6
column interaction 1.1.10.2, 1.1.11.3
force deflection 1.1.4.2
horizontal.....1.1.4.2, 1.4.8.2
intersection angle dimensioning.....2.7.3
on structure 1.1.2.4
rail selection 1.1.21.1, 1.4.4.5
seismic load deflection 1.1.4.2
vertical 1.1.20.4, 1.2.1.8

D

Datum
City of Portland.....2.7.3.2
National Geodetic Vertical.....2.7.3.2
plan and elevation details.....2.6.1, 2.7.3.2

Dead load
beam camber 1.1.17.1
bearings.....1.1.19.1
bent widening 1.1.9.3
box girders.....1.1.16.1
camber diagrams.....1.1.17.1
common metric conversions 1.5.7
deck forms.....1.1.7.1, 1.4.4.3
falsework 1.1.20.4
interim crossbeam reinforcement.....1.1.13.3
overlay loading 1.1.20.5
seismic loading.....1.1.10.2, 1.1.11.3, 1.1.11.4
soundwall 1.4.2.2
structure widening 1.1.14.2, 1.1.15.10, 1.2.1.12
utilities 1.1.7.1
wearing surface 1.1.7.1
wingwall construction 1.1.8.3

Deck
access holes 1.1.15.6
allowable formwork 1.1.15.11, 1.4.4.3
beam seat elevation..... 1.1.14.2
bent joint details..... 1.1.20.2, 1.2.1.10
build-up (superelevation) 1.1.17.2
build-ups (camber)..... 1.1.17.2, 1.2.1.8
clearances (rebar)..... 1.1.13.1
closure pours 1.1.14.2, 1.1.15.10, 1.1.20.4
concrete 1.1.12.1
concrete (general notes).....A2.7.3
construction joint..... 1.1.18.2, 1.1.18.3, 1.1.18.5
continuous over bent 1.1.14.2
continuous reinforcement 1.1.14.2
corrosion protection 1.1.25.3, 1.1.25.4
cracking control..... 1.1.20.1
design and detailing..... 1.1.20.1, 1.6
diaphragm steel 1.1.13.5
drainage..... 1.1.20.3
drainage, p/s slab 1.1.20.4
epoxy coated rebar (general notes).....A2.7.3
expansion joint..... 1.1.20.2
expansion joint seal 1.1.20.2
forms..... 1.1.7.1, 1.1.14.2
glued laminated (general notes) A2.7.3
interim reinforcement..... 1.1.13.1
joint blockouts..... 1.1.20.2
joint details..... 2.7.9
joints, rail..... 1.1.21.3
laminated timber 1.3.2
overhang brackets 1.2.1
overhangs 1.1.2.3, 1.1.16.7
overlays 1.1.20.5
p/t overhangs..... 1.1.16.3
plan detail references A2.7.1
plan detailing..... 2.1.6, 2.7.5
post-tensioned 1.1.2.3
pour schedule 1.1.4.2
pour sequence 1.1.18.2, 1.2.1.9
(on) precast prestressed elements 1.1.14.1
screed 1.1.14.2, 1.1.20.4
stirrups 1.1.14.2
striping, durable inlaid..... 1.1.20.1
structure stability..... 1.1.9.1
structure widening..... 1.1.14.2
typical section 1.1.15.10
typical section detailing..... 2.7.7.2
utilities..... 1.4.7.3
utility hanger inserts..... 1.4.7.3, 1.4.7.6
vibrations during placement..... 1.1.20.1
widening..... 1.2.1.2

Deck elevations
deck plan details 2.7.6

Deck Plan
drawing scales.....2.7.6

Deck screeding
general 1.1.20.4

Deficient
location of curb 1.1.21.2
occupant risk 1.1.21.2
post setback 1.1.21.2
rails.....1.1.21.2
rails, retrofit.....1.1.21.2

Definitions
general ..... Appendix 1B

Deflection
camber diagrams.....1.1.17.1, 1.2.1.8
closure pour.....1.1.14.2
elastic 1.1.11.2
force vs. (Fig) 1.1.4.2
foundation modeling.....1.1.4
interim reinforcement.....1.1.13.3
longitudinal restrainer.....1.1.11.3
overlay effect.....1.1.20.5
pile footing.....1.1.4.2
required to activate.....1.1.4.2
screeding.....1.1.20.4
single mode response 1.1.11.3

Deflections
beam camber 1.1.17.1, 1.2.1.3
cast-in-place.....1.1.16.1
foundation springs.....1.1.4.2
shrinkage camber.....1.2.1.8
timber decks.....1.3.2

Delamination
deck overlays 1.1.20.5
deck preparation.....1.1.20.5

Design
alternate designs 1.1.2.10
anchor bolts 1.1.24
anchors (concrete)..... 1.1.23
accessibility standards..... 1.4.4
attenuators..... 1.4.3
bearings..... 1.1.19
bents..... 1.1.8.7
bicycle rail 1.1.21
bolts and connections..... 1.2.6
bridges..... 1.1.1
buildings under bridges..... 1.4.10
cables and turnbuckles..... 1.2.5
camber..... 1.1.17
CIP superstructures..... 1.1.15, 1.1.16
clearances 1.4.8
cofferdams and seals..... 1.1.3.3, 1.4.9.6
columns 1.1.9.4, 1.1.9.5
concrete strength..... 1.1.12.1, 1.1.14.1
culvert 1.4.5
deck 1.1.20
deck drainage 1.1.20.3
deck overlays..... 1.1.20.5
deviation 1.1.1.1
drilled shafts..... 1.1.4.3, 1.1.5.5
dynamic isolators..... 1.1.10.9
falsework towers 1.1.16.1
flood 1.1.2.2
footings 1.1.3.1, 1.1.3.2
foundations 1.1.5
foundation modeling 1.1.4
fundamental decisions..... 1.1.2
general..... 1.1.2.12
high water 1.1.2.2
hydraulic recommendations..... 1.1.2.2
interior bents..... 1.1.9.1, 1.1.9.2
joints 1.1.20
live loads..... 1.1.7.2
metric units 1.5
pile foundations..... 1.1.5.4
precast elements 1.1.14
prestress tendon path..... 1.1.16.8
protective screening..... 1.4.4.5
rail retrofit..... 1.1.21.2
rails 1.1.2.6, 1.1.21
retaining structures 1.4.1.1
roadway standards..... 1.1.2.2, 1.4.8.1
scour 1.1.2.5
seals 1.4.9.6
security design considerations..... 1.1.1.3
seismic..... 1.1.4.2, 1.1.10.1
seismic restrainers..... 1.1.11
sign, signal and luminaire supports 1.2.2
soundwalls..... 1.4.2
spread footings 1.1.5.3
steel structures 1.2
strutted abutments..... 1.1.8.3
support towers 1.1.16.6
technical bulletin 1.1.1.1
temporary works 1.4.9
timber..... 1.3
underwater..... 1.1.6.1
welding..... 1.2.2
wingwall 1.1.8.3
utilities..... 1.1.2.9, 1.4.7

Design checks
final design 1.1.2.12

Design deviation
request 1.1.1.1

Design costs
added for seismic 1.1.10.7

Designer
checking certification.....1.1.19.2
communication with drafter 2.1.2.1, 2.4.1, 2.5
constructability.....1.1.2.1
deck screeding 1.1.20.4
final design 1.1.2.12
flex polymer overlay 1.1.20.5
foundation and hydraulics 1.1.3.1
foundation.....1.1.4, 1.1.4.2
gutter profiles.....1.1.20.3
inspection report review 1.1.20.5
LMC/MC overlays.....1.1.20.5
overlay criteria.....1.1.20.5
rail replacement.....1.1.20.5, 1.1.21.2
revisions 2.7.10
seal on plans 2.4.3
seismic design.....1.1.10.4
stage construction 1.1.8.3
structure widening 1.1.14.2

Detail references
final plans 2.7.1
numbers A2.7.1
plan detail.....2.7.1, 2.7.6

Detailing
backwalls.....1.1.8.8
bents.....2.7.8
CIP superstructures.....1.1.15
columns(seismic) 1.1.9.5
concrete.....2.2.4
decks.....1.1.20.1
galvanizing 1.2.4.2
interior bents.....1.1.9.1
joints.....1.1.20.1
post-tensioned structures..... 1.1.16.8
practices.....2.2
precast.....1.1.14.1, 1.1.14.2
reinforcing.....2.2.6
segmental construction 1.1.16.5
seismic 1.1.9.5, 1.1.9.6, 1.1.9.8
steel structures.....1.2
structural steel.....2.2.5
superstructure 2.2.6
timber structures.....1.3
using standard drawings 1.1.1.2, 2.4.2, 2.7.2
utilities 1.4.7.3

Details
bent 2.7.8
concrete 2.2.4
deck plan 2.7.6
dimensioning 2.2.3
drawing scales 2.1.6
miscellaneous 2.7.8
reinforcing steel 2.2.6
sheet layout 2.7
steel 2.2.5
superstructure 2.6
TS&L 2.6

Detour
bridges 1.4.9.2
plan and elevation details 2.7.3.1
traffic handling 1.1.2.9

Development of reinforcement
anchors 1.1.23.1
compression 1.1.13.1
flexural 1.1.10.1, 1.1.13.1
hooks required 1.1.9.9, 1.1.13.1
longitudinal 1.1.10.3
tension 1.1.13.1

Diamond grinding
class I deck prep 1.1.20.5

Diaphragm
access holes 1.1.15.6
beam restraint 1.1.14.2
beam steel 1.1.13.5
delayed pour 1.1.14.2
drain holes 1.1.15.7
intermediate cross frames 1.2.1.3
jacking requirement 1.1.19.3
p/s beams 1.1.13.5
reinforcement 1.1.13.5
seismic 1.1.11.2
steel 1.2.1, 1.2.1.3
steel for timber 1.3.3
steel structure widenings 1.2.1.13
structure widening 1.1.15.10
utility attachment 1.4.7.3

Diaphragm beams
access holes 1.1.15.6
detailing 1.1.13.5, 1.1.14.2, 2.7.7.3
locations 1.1.14.2
restraints 1.1.14.2
steel 1.2.1.3
timber 1.3.3

Dimension
access hole 1.1.15.6
bearing seat 1.1.19.2, 1.1.19.4
buildings 1.4.10
column 1.1.9.5
deck screeding 1.1.20.4
end bent 1.1.8.13
end panel 1.1.2.7
interior bent 1.1.9.1
metric plan 1.5
pile 1.1.5
precision 2.2.3
rail height 1.1.20.5
rail joint spacing 1.1.21.1
reinforcement 1.1.13.1
riprap 1.1.3.1

Dimensioning
concrete 2.2.4
examples 2.2.3
general 2.2.3
plan & elevation 2.7.3
reinforcing 2.2.6, 2.2.7
steel 2.2.5

Dimensioning precision
general 2.2.3

Direct discharge
drainage (deck) 1.1.20.3

Dowels
footing 1.1.9.9
pile cap 1.1.8.6

Drafters
archiving 2.10
as constructed 2.7.10
lead duties 2.5
signing title block 2.4.2, 2.4.3

Drafting
CAD files 2.1.2
Cell libraries 2.1.3
computer aided 2.1
detailing 2.2
dimensioning 2.2.3
directory setup 2.1.1
line work 2.2.2
menus 2.1.4
scales 2.1.6
seed files 2.1.5
text 2.2.1

Drafting guidelines
general 2.1

Drainage
beam seat 1.1.8.11
columns 1.1.20.3
deck 1.1.20.3
galvanizing 1.2.4.2
overlays 1.1.20.5
wearing surface 1.1.20.1

Drains
beam seat 1.1.8.11
bent details 2.7.8.2
bottom slab details 1.1.15.7
box girders 1.1.15.7, 1.4.7.4
column 1.1.9.5
deck 1.1.20.3
deck plan details 2.6.1, 2.7.3.1, 2.7.6
galvanizing 1.1.20.3

Drawings
as constructed 2.1.3.1, 2.7.2, 2.7.11, 2.7.11.1
borders 2.3
changes 2.7.2
final drawing numbers 2.4.1
identification tags 2.1.2
layout for large projects 2.7.1
plotting 2.3.1, 2.8
project completion 2.1.3.1
requesting numbers 2.4.1
revisions 2.7.10
scales 2.1.6
standard 2.1.1
title block numbers 2.4.2

Drilled
concrete anchors 1.1.23
holes (timber) 1.3
holes (utility attachments) 1.4.7

Drilled shafts
capacity 1.1.5.5
downdrag 1.1.5.5
embedment 1.1.5.5
foundation modeling 1.1.4.1, 1.1.4.3
general 1.1.5.5
group effects 1.1.5.5
settlement 1.1.5.5
spacing 1.1.5.5
testing 1.1.5.5
uplift 1.1.5.5

Drilling
concrete anchors 1.1.23
holes in concrete 1.1.22, 1.4.7.5

Dynamic Isolators
general 1.1.10.9

E

Earthquake
column details 1.1.9.5
dynamic isolators 1.1.10.9
foundation modeling 1.1.4.2
restrainer design 1.1.11

Earthquake restraint
deck plan details 2.7.5
general notes A2.7.3

Economics
structure layout 1.1.2.3
structure type 1.1.2.4

Elastic
analysis (seismic) 1.1.4.2, 1.1.10.1
seismic restrainer design 1.1.11

Elastomeric
bearing pads 1.1.19.1, 1.2.1.11
concrete 1.1.20.5
list 1.1.20.2
pad clearance 1.1.19.4
placement 1.1.19.4

Electrical
conduits (access) 1.4.7.2

Electrical Conduit
at expansion joints 1.1.20.2
deck plan details 2.7.6

Electronic Files
drawing database 2.8.3
transfer to consultants 2.9

Elevation view
bent 2.7.8.3
final plan sheet 2.7.3.2
general 2.7.3.2
longitudinal beams 2.7.7.4
railroad clearance 2.7.3.8
TS&L sheet 2.6

Elevations
bearing pad 1.1.19.1
bottom of beam 1.1.2.2
bottom of footing 2.7.3.2, 2.7.7.3
datum 2.7.3.2
cofferdam water 1.4.9.6
cofferdam water level 1.4.9.6
deck plan notes 2.7.6
design flood 1.1.2.2
end bent 1.1.8.4, 1.1.8.6
footing 1.1.3.1
high water 1.1.2.2
scour depth 1.1.2.2
top of crossbeam 1.1.14.2
top of footing 1.1.3.1, 1.1.8.4
top of slab 1.1.17.2
wingwall 1.1.8.2, 1.1.8.3

Embankment
bid item 1.1.3.1
placing sequence 1.1.8.3
rail joint 1.1.21.3
riprap 1.1.3.1
wingwall slope 1.1.8.3

Embedment
concrete inserts 1.1.11.2
drilled anchors 1.1.23.2
footing 1.1.4.2
pile 1.1.8.6
pile fixity 1.1.5.7
rail post 1.1.21.1
soundwall pilaster footings 1.4.2.1

End bents
details 1.1.8, A1.1.8.7
general 1.1.8

End panel
concrete 1.1.12.1
criteria for use 1.1.2.7
general 1.1.8.12
overlays 1.1.20.5
general notes A2.7.3
reinforcement 1.1.25.3
utilities 1.1.21.3, 1.4.7.3

Engineering judgement
foundation modeling 1.1.4.2
overlays 1.1.20.5
rails 1.1.21.2
structure modeling 1.1.10.4

Environmental
cultural resources 1.1.2.9
deck drainage 1.1.20.3
structure appearance 1.1.2.3, 1.1.2.9
weathering steel 1.2.1.1
wildlife passage 1.1.2.2

Epoxy
anchors 1.1.23.1
bonding agents 1.1.12.3
coated reinforcement 1.1.13.1, 1.1.20.5, 1.1.25
concrete overlay 1.1.20.5
grout 1.1.23.3

Epoxy coat
corrosion protection 1.1.25
reinforcement (overlays) 1.1.20.5
reinforcement (General Notes) A2.7.3

Epoxy coated
prestress steel (General Notes).....A2.7.3

Epoxy coating
corrosion protection 1.1.25

Erection
joint setting..... 1.1.7.3
welding..... 1.2.2.1

Estimate
added seismic design costs..... 1.1.10.7
cable costs.....A1.2.5
deck overlays..... 1.1.20.5
final 1.1.2.12
seismic..... 1.1.4.2
TS&L..... 1.1.2.11

Excavation
adjacent to buildings 1.4.10
cofferdam..... 1.4.9.6
adjacent to railroads 1.4.8.2
end bents..... 1.1.8.7
footings (undisturbed material) 1.1.3.2
limits..... 1.1.3.2

Existing beams
widenings..... 1.1.14.2, 1.1.15.10, 1.2.1.12

Existing bridge
buildings under 1.4.10
detour..... 1.1.2.9, 1.4.9.2
footings 1.1.6.1
information only plans..... 2.7.10
listing drawing numbers 2.7.10
microstation models..... 2.1.2.1
names 2.4.1
plan and elevation details 2.6.1
rails 1.1.20.5
utility attachments 1.4.7
widening..... 1.1.2.4

Existing footings
footing plan details 2.7.4
buildings adjacent to 1.4.10

Existing Name Plates
general 1.4.6

Expanded polystyrene
removal.....1.1.8.8

Expansion
bearing 1.1.19.2
footing modeling.....1.1.4
joint blockouts 1.1.20.2, 1.2.1.10
joint couplings (conduit) 1.1.20.2
joint details 1.1.20.2, 2.7.3.2, 2.7.6
joints.....1.1.8.6, 1.1.20.2
support condition detailing 2.6.3, 2.7.3.2

Expansion joint
access 1.4.4.2
detailing.....1.1.20.2
integral bent.....1.1.8.4
overlays.....1.1.20.5
rail detailing 1.1.21.1
replacement.....1.1.19.3
seals.....1.1.20.2
seismic 1.1.10.2, 1.1.11.2
setting.....1.1.20.2
welding 1.2.2.1

Expansion joint filler
between bearings.....1.1.19.5
bridge rail.....1.1.21.1

Experimental features
general 1.1.2.10

F

Fabrication
- anchor sleeve 1.1.24.2
- cables 1.1.11.6
- steel beams 1.2.1
- timber 1.3.2
- welding review 1.2.2.1

Fabricator
- reinforcement 1.1.9.1
- steel beam 1.2.1
- welding procedures 1.2.2.1

Factor of safety
- inserts 1.1.11.2
- overturning 1.1.8.5, 1.4.2.3
- resin bonded anchors 1.1.23.2
- seal design 1.4.9.6
- soundwall footings 1.4.2.3
- strutted abutments 1.1.8.5
- utility anchors 1.4.7.5

Falsework
- beam support 1.1.18.1, 1.1.20.4
- box girder 1.1.18.1, 1.1.18.3
- deck screeding 1.1.20.4
- settlement (interim reinforcement) 1.1.13.3
- slabs 1.1.18.5
- structure selection 1.1.2.4
- temporary works 1.4.9
- T-beam 1.1.18.2

Fasteners
- anchors 1.1.23.1
- bolts 1.2.6
- general notes A2.7.3
- mechanical (spiral splicing) 1.1.9.6
- metric 1.5
- seismic 1.1.11.2

Federal Specification
- cables 1.2.5.1
- turnbuckles 1.2.5.1

Federal-aid
- accessibility standards 1.4.4.1
- alternate designs 1.1.2.10
- debris from demolition 1.1.2.10
- special design considerations 1.1.2.10
- unusual structures 1.1.2.10

Fence
- protective 1.4.4.5

Fencing
- combination rail/fence 1.1.21.1
- overlays 1.1.20.5
- protective 1.4.4.5

FHWA
- accessibility 1.4.4.1
- clearance 1.4.8.1
- deck protection 1.1.20.5, 1.1.25.4
- experimental features 1.1.2.10
- inspection walkways 1.4.4.1
- large structures 1.1.2.10
- metric conversion 1.5
- proprietary items 1.1.2.10
- rails 1.1.21.1
- seismic 1.1.4.2, 1.1.10.1
- special design considerations 1.1.2.10
- unusual structures 1.1.2.10
- utility attachments 1.4.7.2

Field splices
- steel girders 1.2.1, 1.2.1.2

Fill
- construction sequence 1.1.8.3
- end bent design 1.1.8.1
- lateral against columns 1.1.8.4, 1.1.9.4
- slope protection 1.1.2.8
- waterway openings 1.1.2.2
- wingwalls 1.1.8.2, 1.1.8.3

Filler
- expansion joint seals 1.1.20.2
- joints in bridge rail 1.1.21.1

Fillet
- weld detailing 2.2.5

Fillet welds
- general 1.2.2.2
- stiffeners 1.2.1.5

Final design
- general 1.1.2.12

Final plans
general 1.1.2.12, 2.7
plotting prints 2.8

Finish
concrete finishes 1.1.12.2

Finishing machine
deck screeding 1.1.20.4

Fixed
bearing 1.1.19.2
columns (spiral reinforcement) 1.1.9.6
footings (strutted abutments) 1.1.8.5
foundations 1.1.4.1
integral cap 1.1.8.6
pile head (footing modeling) 1.1.4.1, 1.1.4.2
support condition detailing 2.7.3.2
supports (pour schedules) 1.1.18.1
supports (seismic modeling) 1.1.4.2, 1.1.10.4

Fixtures
detailing 2.7.5

Flange shear connectors
general 1.2.1.7

Flange welds
general 1.2.1, 1.2.2.3

Flood
cofferdam 1.4.9.6
design 1.1.2.2
extreme 1.1.6.1
hydraulic data details 2.7.3.3

Floods
foundation considerations 1.1.2.2

Footing Plan
CAD files 2.1.2
details 2.6.1, 2.7.2, 2.7.8.4
drawing identification 2.3.1
general 2.7.5
scales 2.1.6
utilities 2.7.3.7

Footings
concrete aggregate size 1.1.9.5
concrete(general notes) A2.7.3
details 2.7.3.2, 2.7.8.5
embedment 1.1.3.1, 1.1.3.2
general considerations 1.1.3.1
modeling 1.1.4.2
pile embedment 1.1.5.4
plan scales 2.1.6
plan 2.7.5
reinforcing 1.1.9.7, 1.1.9.11, 1.1.13.1
seals 1.1.3.3, 1.4.9.6
seismic detailing 1.1.10.3
seismic retrofit 1.1.10.1, 1.1.10.5
sloped 1.1.9.12
soundwall 1.4.2.1
strutted abutments 1.1.8.5
substructure choices 1.1.3.1
utility placement 1.4.7.4, 2.7.5
wingwall 1.1.8.3

Forming
backwalls for end beams 1.1.8.8
sloped footings 1.1.9.12
steel beams 1.2.1

Forms
deck 1.1.7.1, 1.1.9.1
rail 1.1.21.1
removal (box girders) 1.4.4.3
seal considerations 1.1.6.1
stay-in-place 1.1.14.2, 1.1.15.11, 1.4.4.3
stem 1.1.18.3
wingwall 1.1.8.3

Foundation design
general 1.1.5
notes A2.7.3
process 1.1.5.1

Foundation designer
cofferdams 1.1.3.3, 1.4.9.6
earth restraint..... 1.1.3.2
modeling 1.1.4, 1.1.10.4
piling 1.1.5
substructure choices..... 1.1.2.5

Foundation report
Data Sheet..... 2.1.2, 2.7.4
general..... 1.1.5.1
modeling 1.1.4.1, 1.1.4.2
piles 1.1.5.4
substructure choices..... 1.1.2.5

Foundations
cofferdams and seals..... 1.1.3.3, 1.4.9.6
design 1.1.5
footing embedment..... 1.1.3.1, 1.1.3.2, 1.1.6.2
general considerations..... 1.1.2.1
modeling 1.1.4.1
pile cap 1.1.4.2, 1.1.8.6
piling 1.1.5.4
seismic considerations..... 1.1.10.2
seismic foundation recommendations 1.1.5.6
soundwall..... 1.4.2
TS&L narrative..... 1.1.2.11, 1.1.5.1
underwater considerations..... 1.1.6.1

Fracture critical
inspection and maintenance access..... 1.4.4.2
steel detailing..... 1.2.1.1
welding..... 1.2.2.1

Frames
catch basins..... 1.1.2.1
cofferdam bracing..... 1.4.9.6
end..... 1.2.1.5, 1.2.1.6
intermediate cross 1.2.1.3
seismic design 1.1.11.3
utility attachment..... 1.4.7.3

Friction
piles (seismic)..... 1.1.4.2, 1.1.10.5
shear (shear lugs)..... 1.1.11.2
soil (cofferdams and seals)..... 1.1.3.3, 1.4.9.6

G

Galvanized
anchor bolts.....1.1.24.1
bolts.....1.2.6.1
cables..... 1.2.5.1, A1.2.5
concrete inserts.....1.4.7.3
conduit.....1.4.7.3
drain pipe.....1.1.20.3
pipe under end panels.....1.4.7.3
silicon control 1.2.4.3
steel.....1.2.1.1, 1.2.4.1
turnbuckles..... 1.2.5.2, A1.2.5
utility supports 1.4.7.3
water lines 1.4.7.4

Galvanizing
general 1.2.4

Gates Equation
general notes..... 1.1.5.1, A2.7.3

General Notes A2.7.3
cables and turnbuckles 1.2.5.2
concrete strengths.....1.1.14.1
end panels.....1.1.2.7
galvanize-control silicon 1.2.4.3
overlays.....1.20.5
plan and elevation 2.7.3, 2.7.3.4
seismic cables.....1.1.11.6
spiral reinforcing.....1.1.9.6
welding 1.2.2.1

Girders
access 1.1.15.6, 1.4.4.4
aesthetic considerations.....1.1.2.4
bent stability 1.1.9.1
box ventilation 1.4.4.4
composite steel 1.2.1.7
concrete strength.....1.1.14.1
construction joint 1.1.18.1
deck plan details 2.7.5
depths.....1.1.15.1, 1.1.16.1
end bents detailing, steel girders 1.2.1.10
interim reinforcement.....1.1.13.3
longitudinal elevation views.....2.7.7.1, 2.7.7.4
shear correction, skewed 1.1.7.6
shipment.....1.1.14.1
steel design 1.2.1
steel detailing 1.2.1
steel maintenance walkways.....1.4.4.2

Girders - continued

stem access holes 1.4.4.4
stem flares 1.1.15.4
stirrups 1.1.13.1, 1.1.14.2
structure types 1.1.2.4
superstructure detailing 2.7.5
utility locations 1.4.7.1
welded shop lengths 1.2.1
welding 1.2.2.1

Glued laminated
General Notes A2.7.3
timber bridges 1.3.2
timber rail 1.1.21.1, 1.3.2

Grade
accessibility standards 1.4.4.1
bridge length 1.1.2, 1.1.8.1
camber 1.1.17.2, 1.2.1.8
deck drainage 1.1.20.3
geometry 1.1.2.1
overlays 1.1.20.5
steel material identification 1.2.1.1

Grade line diagrams
detailing 2.7.3

Gradelines
beam camber 1.1.17.2, 1.2.1.8
structure types 1.1.2.4

Guardrail
approach 1.1.21.1
box culverts 1.1.21.1
see Bridge Rail 1.1.21
structure layout 1.1.2.3

Gusset
plates 1.2.1.3, 1.2.4.2

H

Handrails
accessibility standards 1.4.4.1
welding 1.2.2.1

Hangers
inspection 1.4.4.2
pipe detailing 2.7.6
utility 1.4.7.3, 1.4.7.6
welding 1.2.2.1

High water
design (bridge length) 1.1.2.2

High water elevation
design flood (bridge length) 1.1.2.2
hydraulic data details 2.7.3.3

High-strength
bolts 1.2.1.3, 1.2.6.1
concrete anchors 1.1.23.1
steel 1.2.1.1

High-strength fasteners
general 1.2.6.1, A2.7.3

Highway Design Manual
design standards 1.1.2.2
roadway clearances 1.4.8.1

Hinge
In-span (seismic) 1.1.11.3, 1.1.11.4
pile cap 1.1.8.6
plastic (seismic) 1.1.9.5

Historical Bridges
protection of cultural resources 1.1.2.9

HL-93
general notes A2.7.3

Holes
access 1.1.15.6, 2.6.1
access through diaphragms 1.1.15.6
box girder drain 1.4.4.4
drain 2.7.5
drilling concrete 1.1.22
galvanizing drains 1.2.4.2
resin bonded 1.1.23.3
timber slotted 1.3.3
utility 1.1.7.1, 1.4.7, 2.7.7.3
vent (cofferdams) 1.4.9.6
ventilation 1.4.4.4

Hoops
column 1.1.9.6, 1.1.9.8, 1.1.9.9, 1.1.13.1

Hydraulic data
general 2.7.3.3
TS&L Plan and Elevation 2.6.1, 2.7.3

Hydraulics
cofferdams and seals 1.4.9.6
deck drains 1.1.20.3
detour 1.4.9.2
general considerations 1.1.3, 1.1.3.4 1.1.2.2, 1.1.2.3
TS&L narrative 1.1.2.11
underwater foundation considerations 1.1.6.1
utility attachments 1.4.7.1

I

Illumination
anchor bolts 1.1.24.1

Impact
attenuators 1.4.3
deck preparation 1.1.20.5
loads (soundwalls) 1.4.2.1
rails 1.1.21.2
tests 1.2.1.1, 1.1.21.2

Impact attenuators
design 1.4.3

Index
CAD files 2.1.2
drawing identification 2.3.1
sheet for large projects 2.7.1

Index sheet
layout for large projects 2.7.1

Information only
designating plans 2.7.2, 2.7.10
title block details 2.4.2

Inserts
concrete 1.1.11.2, 1.4.7.3

Inspection
accessibility 1.1.2.4, 1.4.4.2
box girder access 1.4.4.3
column rebar 1.19.5
deck 1.1.14.2, 1.1.15.11
stem access 1.4.4.4
utilities 1.4.7.1, 1.4.7.2
walkways 1.4.4.2
welding 1.2.2.1

Instrumentation
seismic 1.1.10.8

Integral Bents
joint elimination 1.1.8.4

Interim reinforcement
t-beams 1.1.13.3

Intermediate cross frames
general 1.2.1.3

Intermediate Web Stiffeners
general 1.2.1.4

International System of Units
metric conversion 1.5

Intersection angle
bent centerlines 2.7.5
dimensioning 2.2.3
footing centerline 2.7.4, 2.7.7.4
railroad clearance diagram 2.7.3.8

J

Jacking
bearing replacement 1.1.19.3

Joints
aesthetics 1.1.2.9
bent details 1.1.8.9, 2.7.8.2
bridge rail 1.1.21.1, 1.1.21.3
construction .. 1.1.12.3, 1.1.13.3, 1.1.15.5, 1.1.18.1
deck construction 1.1.20.6
drainage 1.1.20.1, 1.1.20.3
deck plan details 2.7.6
expansion 1.1.8.6, 1.1.20.2
expansion blockout 1.1.20.2, 1.2.1.10
in-span hinges 1.1.10.1
integral bents 1.1.8.4, 1.2.1.11
longitudinal 1.1.20.4
openings (seismic) 1.1.11.2, 1.1.11.3
overlays 1.1.20.5
pre-qualified welding 1.2.2.1
p/s slabs 1.1.8.7, 1.1.25.4, A1.8.7
utility considerations 1.4.4.2
waterproof membranes 1.1.25.4

K

L

Ladders
access holes 1.1.15.6, 1.4.4.4
inspection 1.4.4.2

Large Projects
drafter duties 2.5

Lateral
bent soil loads 1.1.8.1, 1.1.8.4, 1.1.9.4
bracing 1.2.1.3, 1.2.1.5, 1.2.1.6
clearances 1.4.8.2
column ties 1.1.9.5
concrete pile capacity 1.1.5.5
earth restraint 1.1.3.2
footing stiffness 1.1.4.1, 1.1.4.2
load capacity 1.2.1, 1.4.9.2
pile capacity 1.1.4.2
pile fixity 1.1.4.1, 1.1.5.4, 1.1.8.6
pile group factors 1.1.4.2
pile stiffness 1.1.4.2
seismic loading 1.1.4, 1.1.10.2, 1.1.11.3
soil capacity 1.1.4.2, 1.4.2.1
system stability 1.1.9.1, 1.2.1.12
web forces 1.1.16.1
wingwall soil loads 1.1.4.2

Latex Modified Concrete
overlay system 1.1.20.5

Layout
Drawing identification 2.3.1
large projects 2.7.1
microstation models 2.1.2.1
plan organization 2.1.2

Lead Drafter
duties 2.5

Length
beam elevation view dimensioning 2.7.7.4
bent rebar dimensioning 2.2.7
deck plan details 2.6.1
rebar labeling 2.2.7

Lettering
text 2.2.1

Liquefaction
foundation soils 1.1.10.5, 1.1.10.6
mitigation procedures 1.1.10.6

Live load
bearings 1.1.91.2
bridge 1.1.7.2
detour 1.4.9.2
permit trucks 1.1.7.2
soundwalls 1.4.2.1
surcharge 1.1.8.5

Loading
debris 1.1.6.1
foundation modeling 1.1.4
general notes A2.7.3
military 2.7.3.6
pile groups 1.1.4.2, 1.1.5.2
plan details 2.6.1, 2.7.3
seismic foundation 1.1.4.2, 1.1.4.3
seismic restrainer 1.1.11
seismic structure 1.1.10.1, 1.1.10.5
TS&L plan details 2.6.1

Loads
allowable 1.1.3.1
anchors 1.1.23
bearing 1.1.19.2
bearing stiffeners 1.2.1.5
concrete pile 1.1.5.5
cross frame 1.2.1.6
dead 1.1.7.1
debris 1.1.6.1
deck formwork 1.1.7.1
deck screeding 1.1.20.4
design (cofferdams) 1.4.9.6
drilled shaft 1.1.4.1, 1.1.4.3, 1.1.5.5
dynamic isolators 1.1.10.9
footing 1.1.9.11
fillet welds 1.2.2.2
hydraulic 1.1.3.1, 1.4.9.6
hydrostatic (cofferdams) 1.4.9.6
lateral restraint 1.1.3.2, 1.2.1
lateral soil 1.1.8.1
live 1.1.7.2
overlays 1.1.20.5
pile 1.1.4.2
pile group 1.1.4.2
proof 1.1.24.1
railing 1.1.21.1
seismic design 1.1.4.2, 1.1.10.1, 1.1.11
seismic foundation 1.1.3.1
shortening 1.1.7.1, 1.1.16.1
shrinkage 1.1.7.1, 1.1.9.3, 1.1.16.1
soundwall 1.4.2
structure type 1.1.2.4
temporary bridges 1.4.1
transportation 1.2.1
utility 1.4.7.1
utility anchor 1.4.7.5
wearing surface 1.1.7.1
widenings 1.1.14.2, 1.1.15.10, 1.2.1.12
wind 1.1.9.1

Location Map
scales 2.1.6
TS&L plan and elevation 2.6.1

Longitudinal beam
CAD files 2.1.2
drawing identification 2.3.1
elevation view 2.7.7
deck plan detailing 2.7.7
plan and elevation 2.7.3

Lumber
grade(general notes) A2.7.3

Luminaire
design reference 1.2.3
materials 1.2.1.1
silicon control 1.2.4.3

M

Maintenance
accessibility 1.1.2.4, 1.4.4.2
buildings 1.4.10
deck drains 1.1.20.3
manuals – complex details 1.1.2.12
rails 1.1.21.1
stay-in-place forms 1.1.14.2, 1.1.15.11
steel design considerations 1.2.1.1, 1.2.1.3
structure types 1.1.2.4
utility access 1.4.7.1
walkways 1.2.1.3

Maintenance File
end panels 1.1.20.5
existing bridge rail 1.1.20.5
waterproof membrane 1.1.25.4

Manholes
access 1.4.4.4
deck plan details 2.6.1, 2.7.6

Maps
state, county and city on CAD 2.6.2

Materials
anchor bolts 1.1.23.1, 1.1.24.1
demolition debris..... 1.1.2.10
forming..... 1.1.8.8
furnishing on plans..... 2.7.5
joint materials..... 1.1.20.2
salvage .....1.1.2.9(7)
steel 1.2.1
welding..... 1.2.2.1

Mechanical anchors
holes in concrete..... 1.1.22
utility attachments 1.4.7.5

Median
column locations 1.1.2.3
attenuator design 1.4.3.1
seismic design 1.1.10.1

Median Barrier
single slope..... 1.1.21.1
temporary barrier 1.1.21.4
type F 1.1.21.1

Metric
conversion 1.5

Microsilica
concrete mix 1.1.25.2, 1.1.25.3
corrosion protection 1.1.25.2, 1.1.25.3
deck overlays..... 1.1.20.5

Military Loading
plan details..... 2.7.3.6

Mylar
changes 2.7.2, 2.7.11
plotting final drawings 2.3, 2.8.1

N

Name Plates
existing 1.4.6

Names on sheets
structure sheet requirements.....2.4.2

Non-breakaway
sign supports 1.4.3.1

O

Openings
access 1.4.4.2
fencing.....1.4.4.5
galvanizing 1.2.4
joint (restrainer design).....1.1.11.3
rail.....1.1.21.2
waterway 1.1.2.2

Overhangs
deck.....1.1.2.3
deck reinforcement.....1.1.16.3, 1.1.16.7
rail capacity 1.1.21.2

Overlays
ACWS and membrane 1.1.20.5, 1.1.25.4
deck.....1.1.20.5
end panels.....1.1.2.7
epoxy concrete 1.1.20.5
flexible polymer concrete.....1.1.20.5
latex modified concrete 1.1.20.5
microsilica concrete.....1.1.20.5
structure widening 1.1.25.3

Overpass
pedestrian.....1.4.4.1, 1.4.4.5

Owner
utility details.....2.7.6

P

Pads
elastomeric bearing 1.1.14.1, 1.1.19.1, 1.1.19.5

Painting
bearings 1.1.19.2
girder ends 1.2.1.10
inspectors 1.2.2.1
maintenance 1.2.1, 1.2.1.1, 1.2.1.3, 1.4.7.1
new or existing metal 1.2.4.4
recoating existing metal 1.2.4.5

Parapets
attenuator design 1.4.3.1
bridge rails 1.1.21.1
combination 1.1.21.1
deck plan details 2.7.6
drainage 1.1.20.3
openings and snagging 1.1.21.1
pedestrian 1.1.21.1
retrofit details 1.1.21.2
typical section details 2.7.7.2

Paving dams (nosing)
deck joints 1.1.20.5

Paving ledges
end panels 1.1.18.12, 1.1.20.5

Pedestal
bearing 1.1.8.11

Pedestrian
accessibility 1.4.4.1
bridge design 1.1.1, 1.1.7.2, 1.3.2
bridge rail 1.1.21.1
fence 1.4.4.5
protective screening 1.4.4.5
rail 1.1.21.1
railings (galvanizing) 1.2.4.3
traffic during construction 1.1.2.9

Permit trucks
figures 1.1.7.2

Piers
naming and numbering 2.6.1
seismic reduction factors 1.1.10.2

Pile
anchor 1.1.5.4
bearing capacities 1.1.5.4
concrete 1.1.5.4
cover plates 1.1.5.4
cut off (cofferdam) 1.4.9.6
downdrag 1.1.5.4
embedment 1.1.5.4
foundation considerations 1.1.3.1, 1.1.3.2
foundation modeling 1.1.4
groups 1.1.4.2, 1.1.5.4
pullout capacity 1.4.9.6
seismic design 1.1.4, 1.1.10
sheet 1.4.9.6
splices 1.1.5.4
tip reinforcement 1.1.5.4
underwater considerations 1.1.5.4, 1.1.6
uplift 1.1.5.4

Pile bent
seismic design 1.1.4

Pile foundations
design 1.1.5.4
general 1.1.5.4

Pile cap
details 1.1.8.6
pile embedment 1.1.5.4
seismic design 1.1.4
width considerations 1.1.8.13

Piles
footing plan location 2.7.8.4
general 1.1.5.1
spacing 1.1.5.4

Pin & Loop
temporary barrier 1.1.21.4

Pins
support condition detailing 2.6.3, 2.7.3.2

Pipe
arches 1.4.5
drainage 1.1.8.11, 1.1.9.5, 1.1.20.3
deck plan detailing 2.7.6
dimensioning 2.2.3
hanger details 2.7.6
pile (general notes) A2.7.3
piles 1.1.5.4
pile (stiffness) 1.1.4.2
utility 1.1.7.1, 1.4.7.3

Plan
CAD files 2.1.2
deck detailing 2.7.5
details 2.4.3, 2.7.2
general 2.7.3.1
footing details 2.7.5
scales 2.1.6
TS&L 2.6.1

Plan and Elevation
CAD files 2.1.2
details 2.7.3
drawing identification 2.3.1
drawing scale 2.1.6
General Notes A2.7.3
TS&L 2.6

Plans
CAD files 2.1.2
final 2.7
for information only 2.7.10
organization 2.1.2, 2.3.1
plotting 2.8
revised 2.7.10

Plastic
concrete 1.1.20.4
hinge (seismic) 1.1.9.5, 1.1.10.2, 1.1.11
moment (seismic) 1.1.9.6, 1.1.9.9, 1.1.10
movements (seismic) 1.1.11

Plate
bearing steel 1.1.19.1, 1.1.19.2
diaphragms 1.2.1.3
galvanizing 1.2.4.2
gusset 1.2.1.3
pile tip 1.1.5.4
pile top 1.1.5.4
steel detailing 1.2.1, 1.2.1.4, 2.2.5
welding 1.2.2.2

Post-tensioned
backwall reinforcement 1.1.8.10, 1.1.13.1
bridges 1.1.2.4, 1.1.16
concrete 1.1.12.1
creep & shrinkage 1.1.16.1
design 1.1.16
integral bents 1.1.8.4
shortening 1.1.7.1, 1.1.16.1
structure joints 1.1.8.9, 1.1.20.2

Post-Tensioning
bearings 1.1.19.2
deck overhangs 1.1.2.3
duct conflicts 1.1.9.9, 1.1.13.4
general 1.1.16
shortening 1.1.7.1, 1.1.16.1
staging 1.1.18.4
strand duct placement 1.1.16.8

Posts
collision 2.7.3.8
light detailing 2.7.6

Pour
bottom slab for CIP structures 1.1.16.8, 1.1.18.1
closure pour 1.1.8.13
deck pour sequences 1.1.18
diaphragm 1.1.14.2
pour schedules 1.1.18
precast closure 1.1.14.2
slabs 1.1.18.5

Poured Joint Sealer
expansion joint seals 1.1.20.5

Pouring
against undisturbed material 1.1.3.2, 1.1.4.2
deck sequences 1.1.18
overlay limitations 1.1.20.5

Precast
barriers 1.1.2.7
bent width provisions 1.1.8.13
elements (general) 1.1.2.4, 1.1.14
general notes A2.7.3
members (corrosion protect.) 1.1.25.2, 1.1.25.3
members (span range) 1.1.2.4
piling 1.1.5.5
prestressed beams 1.1.14.2
slabs 1.1.14.1
superstructure details 2.7.7.1
verses CIP 1.1.2.4

Precast Prestressed Elements
stage construction, side-by-side units..... 1.1.14.3

Precast Prestressed Girders
camber 1.1.17.3
deck reinforcement 1.1.14.2
general 1.1.2.4, 1.1.14.2
structure widenings 1.1.14.2

Precast Slabs
abutments 1.1.8.7
bent width provisions 1.1.8.13
camber 1.1.17.2
general 1.1.2.4, 1.1.14.1

Precast trapezoidal box
general 1.1.16.2

Preformed expansion joint filler
expansion joint seals 1.1.20.2

Preservative
Treatment (general notes) A2.7.3
wood treatments 1.3.5

Pressures
cofferdam water 1.4.9.6
end bent soil 1.1.9.4
foundation bearing 1.1.3.1
lateral earth 1.1.3.2, 1.1.9.4, 1.4.2.3
overburden 1.1.4.2
passive earth 1.1.3.2, 1.1.3.3
passive soil 1.1.8.4
strutted earth 1.1.8.5
wingwall lateral 1.1.8.3

Prestressed
beams 1.1.14.2
concrete 1.1.12.1, 1.1.14.1
concrete elements 1.1.8.1
creep and shrinkage 1.1.14.1
design 1.1.14
members(general notes).....A2.7.3
piling 1.1.4.2, 1.1.5.5
precast concrete details..... 2.7.7.1, 2.7.7.4
slabs and boxes 1.1.14.1

Prestressed members
end bent details 1.1.8.7
interior bent details for slabs 1.1.9.2

Prestressed-precast
general notes..... A2.7.3

Prestressing steel
general notes..... A2.7.3

Project Manager
existing name plates.....1.4.6.1
overlays 1.1.20.5

Proprietary
bearings.....1.1.19.2
items.....1.1.2.10

Protective screening
Bridge rail 1.1.2.6, 1.1.21
general 1.1.20.5, 1.4.4.5

Pumping
water from cofferdam 1.4.9.6

Q

Qualified products list
bearings.....1.1.19.2
joints.....1.1.20.2
overlays 1.1.20.5
proprietary items.....1.1.2.10
waterproof membrane 1.1.25.4

R

Rail
added rebar details 2.7.7.2
bicycle and pedestrian rail 1.1.21.1
bridge rail 1.1.21.1
combination rail..... 1.1.21.1
deck drainage 1.1.20.3
deck finishing 1.1.14.2
dimensioning..... 2.2.3, 2.7.6
end panel 1.1.2.7, 1.1.8.12
example calculations 1.1.21.1, 1.1.21.2
finish 1.1.12.2
galvanizing..... 1.2.4.3
identifying deficiencies..... 1.1.21.2
inspection..... 1.4.4.2
over culverts 1.1.21.1
pedestrian 1.1.21, 1.4.4.5
plan details..... 2.6.1, 2.7.3.2
post lengths 1.1.17.2
rail joints..... 1.1.21.3
required performance level 1.1.21.2
retrofit guidelines 1.1.21.2
selection..... 1.1.2.6, 1.1.21.1
temporary..... 1.1.21.4
timber 1.3.4

Railroad
clearance Diagram..... 2.6.3, 2.7.3.8
clearances 1.4.8.2
construction clearance..... 2.7.3.9
design permission..... 1.1.1
design specifications..... 1.1.1
existing tracks 2.7.3.7
footing depth 1.1.3.1
gradeline details..... 2.7.3.5
protective screening..... 1.4.4.5

Railroad Shoring
plan details..... 2.7.1, 2.7.3.9

Ramps
accessibility standards..... 1.4.4.1
protective fencing..... 1.4.4.5
sidewalks 1.4.8.1
widths..... 1.4.8.1

Recreational/Cultural Resources
protection.....1.1.2.9

Reference numbers
general A2.7.3

References
typical detail..... 2.7.1, A2.7.1
deck plan.....2.7.5

Reinforcement
abutment 1.1.8.3
added shear 1.1.13.4
backwall.....1.1.8.10
bearing 1.1.19.1
bundled.....1.1.13.1
bearing pad 1.1.19.4
column seismic.....1.1.9.6, 1.1.9.7
corrosion protection.....1.1.25
deck.....1.1.14.2, 1.6
deck overhangs.....1.1.16.7
deck section details.....2.7.8.2
development.....1.1.10.2, 1.1.13.1
diaphragms.....1.1.13.5
drilled embedment.....1.1.23.2
drilling through.....1.1.22, 1.4.7.6
end panels.....1.1.25.3
field bent (general notes)..... A2.7.3
footing details 1.1.9.10, 1.1.9.11, 2.7.8.5
general 1.1.13
general notes..... A2.7.3
headed ..... 1.1.13.1(16)
interim..... 1.1.13.3
pile tip.....1.1.5.6
shear 1.1.13.1
spirals.....1.1.9.6, 1.1.9.8
spacing.....1.1.13.1
standard sizes 1.1.13.1
stirrups.....1.1.14.2
temperature 1.1.13.1
splices 1.1.13.1
welded 1.1.9.6, 1.1.13.1, 1.2.2.1
wingwalls 1.1.8.3

Reinforcing steel
- anchors 1.1.23.1
- bent detailing 2.2.7
- confining (seismic) 1.1.10.2
- cover (concrete) 1.1.13.1
- corrosion protection 1.1.25
- details 2.7.8.5
- drilling through 1.1.22, 1.4.7.5
- epoxy coated (corrosion protection) 1.1.25
- flexural development 1.1.13.1
- footing 1.1.9
- General Notes A2.7.3
- interim 1.1.13.3
- interior bents 1.1.9.1
- labeling 2.2.6, 2.2.7
- metric 1.5
- overlays 1.1.20.5
- seismic 1.1.9
- spacing 1.1.13.1
- splicing 1.1.13.1, A2.7.3
- standard sizes 1.1.13.1
- waterproof membrane 1.1.25.4
- welded 1.1.9.6, 1.1.13.1, 1.2.2.1

Removal
- ACWS 1.1.25.4
- bearing 1.1.19.2
- cofferdam 1.1.2.9, 1.1.6.1
- deck overlay 1.1.20.5
- detour structure detailing 2.7.3.1
- forms 1.1.8.8, 1.4.4.3

Resin bonded anchors
- design 1.1.22, 1.1.23
- utility attachments 1.4.7.5

Restrainer
- longitudinal earthquake 1.1.11.2, 1.1.11.3
- seismic (general) 1.1.11
- transverse earthquake 1.1.11.4

Restraint
- diaphragm beam 1.1.14.2
- lateral earth 1.1.3.2
- seismic cables 1.1.11.6, 1.2.5.3, A1.2.5
- steel 1.2.1.1
- welding 1.2.2.1

Retaining wall
- design, general 1.1.2.9, 1.4.1.1
- end bent 1.1.8.4
- soundwall on 1.4.2.1, 1.4.2.2

Revisions
- drawings 2.7.11

Right-of-way
- Design considerations ..... 1.1.2.9(5)
- utilities on structures 1.4.7.2

Riprap
- cofferdams 1.1.3.3, 1.1.6.1, 1.4.9.6
- foundation considerations 1.1.2.5, 1.1.3.1
- plan details 2.7.3.3

Roadway
- Bridge length 1.1.2.1, 1.1.2.3
- clearances 1.4.8.1
- footing detailing 1.1.8.4
- plan details 2.2.3, 2.6.1, 2.7.3.1, 2.7.3.5
- project geometry 1.1.2.1
- protective fencing 1.4.4.5
- shoulder (bikeway) 1.1.2.9
- slope paving 1.1.2.8
- structure types 1.1.2.4
- utilities 1.4.7.2
- wingwalls 1.1.8.2

Roadway engineering
- attenuator design 1.4.3.1
- deck overlays 1.1.20.5

Rock
- footing embedment 1.1.3.1, 1.1.4.2, 1.1.6.2
- slope protection 1.1.2.8

S

Safety
and accessibility requirements..... 1.4.4
cables 1.2.5.1, 1.2.5.3
clearances 1.4.8.1
code (reference) 1.4.4.2
protective fencing..... 1.4.4.5
wingwalls 1.1.8.2

Safety factor
foundations 1.1.2.2, 1.1.4, 1.4.9.6, 1.1.8.5
mechanical anchors..... 1.1.11.2, 1.4.7.5

Salvage
existing name plates 1.4.6.1
materials 1.1.2.9

Sandblasting
steel members 1.2.1.3

Scales
drafting..... 2.1.6

Scour
foundation 1.1.2.2, 1.1.2.5, 1.1.3.1, 1.1.4.2, 1.6
ODOT design instruction 1.6
seal design considerations 1.1.6.1, 1.4.9.6

Screed
deck screeding..... 1.1.14.2, 1.1.18.4, 1.1.20.4

Sealers
concrete 1.1.25.2
decks 1.1.20.5
poured joint 1.1.20.2

Seals
concrete (general notes) 1.1.12.1, A2.7.3
design considerations (footing) 1.1.3.1
design example (footing).....1.4.9.6
expansion joint seals.....1.1.20.2
footing details 1.1.3.3, 1.4.9.6, 2.7.3.3, 2.7.8.4
foundation design considerations.....1.1.3.1

Seats
beam elevations 1.1.14.2
beam, drainage 1.1.8.11
bearing seats.....1.1.8.3, 1.1.9.4, 1.1.19.5
width (restrainer design).....1.1.11.2

Sections
drawing scales.....2.1.6
superstructure detail.....2.7.7.2
typical deck details 2.7.7.2

Security
design considerations 1.1.1.3

Segmental
segmental construction 1.1.16.5

Seismic
cables and turnbuckles 1.1.11, 1.2.5
column design 1.1.9.5
column hoops, spirals 1.1.9.6
construction costs 1.1.10.7
deck joints 1.1.20.2
design costs 1.1.10.7
design reference.....1.1.4.2
design, general.....1.1.4.2, 1.1.10, 1.1.11
drilled shaft modeling 1.1.4.3
dynamic isolators.....1.1.10.9
end bent height.....1.1.8.4
footing design 1.1.10.5
foundation modeling 1.1.4
foundation recommendations.....1.1.5.6
General Notes A2.7.3
Guide Specifications, LRFD 1.1.10.1, 1.1.10.3-1
hold-downs 1.1.11.5
instrumentation.....1.1.10.8
lateral earth restraint 1.1.3.2
liquefaction mitigation..... 1.1.5.6, 1.1.10.6
maps.....1.1.10.1
precast concrete piling 1.1.5.5
resin bonded anchors.....1.1.23
restrainer design.....1.1.11
retrofits 1.1.10.1
site factor / site class.....1.1.10.2
soundwall loads.....1.4.2.2
structure modeling.....1.1.10.4
structure types.....1.1.2.4
temporary structures 1.4.9.2
welding 1.2.2.1
widening design.....1.1.10.1

Seismic instrumentation
general 1.1.10.8

Sewer lines
structure considerations 1.4.7.4

Shear
added reinforcement 1.1.13.4
anchor piles 1.1.5.4
concrete inserts 1.1.11.2
connections 1.1.12.3, 1.2.1.7
correction factor, skewed girders 1.1.7.6
drilled shaft modeling 1.1.4.3
fixed bent 1.1.8.6
foundation modeling 1.1.4.1, 1.1.4.2
hinged bent 1.1.8.6
key (deck) 1.1.15.5
reinforcement 1.1.13.1
resin bonded anchors 1.1.23
restrainer design 1.1.11.2
seismic design 1.1.10.2
wales (cofferdams) 1.4.9.6

Shear Connectors
general 1.1.12.3, 1.2.1.7

Shear Key
construction joints 1.1.15.5, 1.1.20.6

Shear Reinforcement
additional in beams 1.1.13.4

Shop drawings
bearings 1.1.19.2
traffic structures 1.2.3
welding details 1.2.2.1

Shoring
design reference 1.4.9.1
railroad detailing 1.4.8.2
structure type 1.1.2.9
temporary construction 1.4.9.3

Shoulder
barrier 1.1.21.1
bikeways 1.1.2.9
protective screening 1.4.4.5
utilities 1.4.7.2
walkways (maintenance) 1.4.4.5
widths 1.4.8.1

Shrinkage
anchor bolt tension 1.1.24.1
bearing design 1.1.19.1, 1.1.19.2
camber 1.1.17.1, 1.2.1.8
construction joints 1.1.20.6, 1.1.21.1
design for 1.1.7.1, 1.1.14.1, 1.1.16.1
joint design 1.1.20.2
longitudinal restrainer design 1.1.11.3
pour schedules 1.1.18.1
reinforcement 1.1.13.1
timber 1.3.3
widening loads 1.1.9.3

Sidewalks
combination 1.1.2.9, 1.1.21.1
curbs 1.1.21.1
end panels 1.1.2.7, 1.1.8.12
height 1.4.8.1
prestressed member considerations 1.1.14.1
protective screening 1.4.4.5
rail 1.1.21.1
reinforcement 1.1.25.3
traffic 1.1.21.1
utility locations 1.4.7.1
width (reference) 1.4.8.1

Sign bridges
galvanizing 1.2.4.3
general 1.2.3

Signals
anchor bolts 1.1.24.1
supports (general) 1.2.3

Signs
anchor bolts 1.1.24.1
structure mounts 1.2.3
supports (general) 1.2.3

Silicon Control
general 1.2.4.3

Simple spans
deck reinforcement 1.1.14.1
design 1.1.15.1, 1.1.16.1
restrainer design 1.1.11.3

Skew angle
deck plan detailing 2.7.6

Skewed
bearing pads 1.1.19.4
box girders 1.1.16.1
cross beams 1.1.13.3
deck screeding 1.1.20.4
joints 1.1.20.2
precast members 1.1.14.1
rail joints 1.1.21.3

Slabs
access holes 1.1.15.6, 1.4.4.4
bent details 1.1.8.7, 1.1.9.2, 1.1.19
bent width provisions 1.1.8.3
bottom (details) 1.1.15.7, 1.1.16.1, 1.1.16.8
construction joints 1.1.15.5, 1.1.18
continuous CIP 1.1.13.3
deck (overlay) 1.1.20.5
end panels 1.1.8.12
prestressed 1.1.2.4, 1.1.8.1, 1.1.17.2
prestressed details 1.1.13.1, 1.1.14.1
utilities 1.4.7.3
widenings 1.1.15.10

Slope paving
detailing 2.7.3.2
usage 1.1.2.2, 1.1.2.8

Sloped
ground (soundwall) 1.4.2.1
footings 1.1.8.6, 1.1.9.12
rails 1.1.21.2

Slopes
bridge length 1.1.2.2
columns in 1.1.9.4
protection 1.1.2.8
riprap 1.1.3.1
wingwall construction 1.1.8.3
wingwall locations 1.1.8.1, 1.1.8.2

Soil
classification 1.1.10.1, 1.1.10.2
cofferdam considerations 1.4.9.6
considerations (soundwalls) 1.4.2.1
drilled shaft modeling 1.1.4.1, 1.1.4.3
end bent design 1.1.8.1
foundation modeling 1.1.4
lateral earth restraint 1.1.3.2
liquefaction 1.1.10.5, 1.1.10.6
seal sheet piling 1.4.9.6
seismic design 1.1.10
springs 1.1.4
strutted abutment design 1.1.8.5
type (soundwall) 1.4.2.1
wingwall construction 1.1.8.3

Soil pressure
end bents 1.1.8.4
strutted abutments 1.1.8.5

Soundwalls
general 1.4.2.1
on bridges 1.4.2.2
on retaining walls 1.4.2.2
pay limits 1.4.2.4
seismic load 1.4.2.2
wind map (Fig) 1.4.2

Span lengths
deck overlay 1.1.20.5
effective 1.1.9.1
structure layout 1.1.2.3
structure type 1.1.2.4

Special Provisions
- anchor bolts 1.1.24.1
- bearing replacement 1.1.19.3
- cable (general notes) A2.7.3
- cables 1.1.11.6, 1.2.5.3
- construction 1.1.1
- detour bridges 1.4.9.2
- embankment placing sequence 1.1.8.3
- final design 1.1.2.12
- overlays 1.1.20.5
- pile capacities (general notes) A2.7.3
- pile foundations 1.1.5.4
- resin bonded anchors 1.1.23.3
- spiral reinforcing 1.1.9.6
- steel 1.2.1.1
- turnbuckles 1.2.5.4
- utilities 1.4.7.1
- waterproof membranes 1.1.25.4
- welding 1.2.2.1

Specifications
- anchor bolts 1.1.23.1, 1.1.24.1
- backfilling 1.1.3.2
- bearing 1.1.19.2
- cables & turbuckles 1.2.5, A1.2.5
- construction 1.1.1
- deck design 1.1.20.1
- design 1.1.1, 1.1.7.2
- live loading 1.1.7.2
- overlays 1.1.20.5
- proprietary items 1.1.2.10
- rail 1.1.21.1
- rail retrofit 1.1.21.2
- railroad clearances 1.4.8.2
- seismic design 1.1.9.5, 1.1.10, 1.1.11
- soundwall design (reference) 1.4.2.1
- special provisions 1.1.2.12
- steel 1.2.1.1
- temporary workst 1.4.9.1
- timber design (reference) 1.3.2
- welding 1.2.2.1

Splices
- column bars 1.1.9.9, 1.1.13.1
- column hoops 1.1.9.6
- general notes A2.7.3
- lap 1.1.9.9, 1.1.13.1
- mechanical 1.1.9.9, 1.1.13.1
- rebar labeling 2.2.7
- reinforcement 1.1.9.9, 1.1.13.1
- seismic 1.1.10.2
- spiral column 1.1.9.6
- steel beam 1.2.1
- steel pile 1.1.5.4
- welded 1.1.9.6, 1.1.9.9, 1.1.13.1

Spread footings
- cover 1.1.3.1
- design 1.1.5.3
- foundation modeling 1.1.4.2
- general considerations 1.1.3.1
- liquefaction potential 1.1.10.5
- seal design considerations 1.4.9.6
- seal design example 1.4.9.6
- soundwalls 1.4.2.3

Standard Drawings
- access holes 1.1.15.6, 1.4.4.4
- beam stirrups 1.1.14.2
- CAD Directory 2.1.1
- cell libraries 2.6.3
- final plan requirements 2.7.2
- joints 1.1.14.1, 1.1.20.2
- manual 1.1.1
- precast beams 1.1.14.1, 1.1.17.3
- p/t beams 1.1.16.1, 1.1.16.8
- project sheet numbering 2.4.2
- protective fencing 1.4.4.5
- rails 1.1.21.1
- slab design 1.1.14.1
- slope paving 1.1.2.2, 1.1.2.8
- soundwalls 1.4.2.1
- steel 1.2.1
- stem flare 1.1.15.4
- title block requirements 2.4.2

Standard Specifications
- construction 1.1.1
- design 1.1.1
- General Notes A2.7.3
- seismic (general notes) A2.7.3

Steel
anchor bolts 1.1.23.2, 1.1.24.1
beam camber 1.2.1.8
bearings 1.1.19.1, 1.1.19.2, 1.2.1.12
bolts 1.2.6
cables (seismic) 1.2.5
corrosion protection 1.2.1.1
cross frames at bents 1.2.1.6
design (general) 1.2.1
detailing 2.2.3, 2.2.5
diaphragm beam 1.1.13.5, 1.2.1.3
drain pipe 1.1.20.3
end bents detailing 1.2.1.10
expansion joint blockouts 1.2.1.11
flange butt welds 1.2.2.3
girder details 1.1.13.3, 1.2.1
girder widenings 1.2.1.12
inspectors 1.4.4.2
materials 1.2.1.1
painting, girder ends 1.2.1.10
painting or coating new/existing metal 1.2.4.4
pile embedment 1.1.5.4
pile grade (general notes) A2.7.3
pile splices 1.1.5.4
pile tips 1.1.5.4
piling 1.1.5
rails 1.1.21.1, 1.1.21.2
recoating existing metal 1.2.4.5
restrainer 1.1.11.2
rods (seismic) 1.1.11.2
sheet piles 1.4.9.6
silicon control 1.2.4.3
structure type 1.1.2.4
structures (utilities) 1.4.7
weathering 1.2.1.1
welding 1.2.2
welded girder lengths 1.2.1, 1.2.1.2
welded web splices in steel girders 1.2.2.4

Steel beams
superstructure design 1.2.1
transportation lengths 1.2.1, 1.2.1.2

Stiffeners
bearing 1.2.1.5, 1.2.1.6
flange connections 1.2.1.3
intermediate cross frame 1.2.1, 1.2.1.3
intermediate web 1.2.1, 1.2.1.4

Stirrups
beam 1.1.14.2
cover 1.1.13.1
field bent (general notes) A2.7.3

Stock bar
length 1.1.13.2

Strengthening
permanent (reinforced concrete) 1.1.12.5

Stress
anchor bolt 1.1.24
axial 1.1.10.2
bolt 1.1.24
concrete 1.1.12.1
concrete pile 1.1.5.5
creep & shrinkage 1.1.14.1, 1.1.16.1
effective unit 1.1.4.2
edge 1.1.11.2

Stringers
timber (general notes) A2.7.3
welding 1.2.2.1

Strip Seal
general 1.1.20.2

Striping, traffic lane
durable inlaid 1.1.20.1

Structural steel
fabricator certification 1.2.2.1
General Notes A2.7.3
materials 1.2.2.1
restrainer 1.1.11.2
superstructure design 1.2.1

Structure Mounted Signs
general 1.2.3

Structure Widenings
cast-in-place 1.1.15.10
corrosion protection 1.1.25.3
deck drainage 1.1.20.3
interior bents 1.1.9.3
precast beams 1.1.14.2
protective fencing 1.4.4.5
steel 1.2.1.12

Structures
large or unusual 1.1.2.4, 1.1.2.10

Struts
cofferdam braces 1.4.9.6

Strutted
abutments 1.1.8.5

Substructure
bent detailing 1.1.8.6
bridge length 1.1.8.1
bridge type 1.1.2.4
choices..... 1.1.2.5
creep & shrinkage..... 1.1.16.1
finish 1.1.12.2
foundation design 1.1.5
modeling 1.1.4, 1.1.4.3
restrainer design 1.1.11.1
seismic retrofit..... 1.1.10.1
timber 1.3.2

Superelevation
adjustments to curbs, post length 1.1.17.2
beam camber 1.2.1.8
deck screeding..... 1.1.20.4
maximum on bridges 1.1.2.1
project review..... 1.1.2.1
slab camber 1.1.17.2
structure type 1.1.2.4

Superstructure
bent connections..... 1.1.8.6
bridge length 1.1.8.1
CIP 1.1.15
concrete finish..... 1.1.12.2
construction sequence..... 1.1.9.1
creep & shrinkage..... 1.1.14.1, 1.1.16.1
depths 1.1.2.3
drilled shaft modeling..... 1.1.4.3
foundation modeling 1.1.4.1
interim reinforcement 1.1.13.3
restrainer design 1.1.11
seismic retrofit..... 1.1.10.1, 1.1.11
strutted abutments 1.1.8.5
utilities..... 1.4.7.1
widening..... 1.1.14.2, 1.1.15.10, 1.2.1.12
wingwall construction 1.1.8.3

Superstructure Details
general 2.7.7

Support Tower
details and notes 1.1.16.6

Surface finish
concrete finishes 1.1.12.2
construction joints 1.1.15.5

Symbols
CAD welding.....2.2.5
standard 2.2.2
weld 2.2.5

T

T-Beams
interim reinforcement.....1.1.13.3
stirrup clearance.....1.1.13.1
supported on falsework 1.1.18.2

Technical
bulletin 1.1.1.1

Temperature
bearing design.....1.1.19.1, 1.1.19.2
joint openings 1.1.20.2
ranges 1.1.7.3
reinforcement 1.1.13.1
restrainer design.....1.1.11.3

Temporary construction
Agency provided detour bridge 1.4.9.3
barrier 1.1.20.5, 1.1.21.4
cofferdams.....1.1.3.3, 1.4.9.6, 1.1.6
detour 1.1.2.9, 1.4.9.2
diaphragms.....1.1.14.2
falsework 1.4.9.4
general 1.4.9
rail.....1.1.21.1, 1.1.21.4
shoring.....1.4.9.5

Text
CAD menus 2.2.1

Thrie-beam
post detail (temporary) 1.1.21.4
rail 1.1.21.1
retrofit 1.1.21.2

Ties
column 1.1.9.5, 1.1.9.8

Timber
bridge design (general) 1.3.2
bridge locations 1.3.1
bridges 1.1.2.4
connections 1.3.3
decks 1.1.25.4
design and details 1.3.2
general notes A2.7.3
piles 1.1.5.1
rail posts 1.1.21.1
rails 1.1.21.1, 1.3.4
treatment 1.3.5

Timber rail
general 1.1.21.1, 1.3.4

Tip reinforcement
piles 1.1.3.1, 1.1.5.4

TP&DT
overlays 1.1.20.5

Title block
example (fig) 2.4.2
required information 2.4.2
revision column 2.7.11

Tower
support tower detail 1.1.16.6

Traffic
access location 1.1.15.6
barrier (conduit encasement) 1.4.7.4
bridge length 1.1.2.2
handling and data 1.1.2.9
plan details 2.7.3.1
project review 1.1.2.1
protective screening 1.4.4.5
rail 1.1.21.1
reflective chevrons 1.4.3.2
staging (end panels) 1.1.20.5
staging (overlays) 1.1.20.5
structure (design) 1.2.3
structure layout 1.1.2.3
structure type 1.1.2.4
utilities 1.4.7.1
vertical clearance diagram 2.6.3

Tremie
general 1.4.9.6

Truss
deck steel 1.1.25.3
type bridge 1.1.2.4
welding 1.2.2.1

TS&L
estimate 1.1.2.11
foundation memo 1.1.5.1
general 1.1.2.11
information required on plans 2.6
narrative 1.1.2.11
overlays 1.1.20.5
utilities 1.4.7.6

Turnbuckles
general 1.2.5.2, A1.2.5
restrainer design 1.1.11.2
special provisions 1.2.5.4, A1.2.5

U

Underpass
accessibility standards 1.4.4.1
clearances 1.4.8.1

Underwater
construction (general) 1.1.6

Uplift
hydrostatic 1.4.9.6
pile 1.1.5.4
pile capacity 1.1.5.4, 1.4.9.6
seismic considerations... 1.1.4.2, 1.1.10.3, 1.1.10.5

Utilities
accessibility 1.4.7.1
agreements 1.4.7.5
bent details 1.1.8.4, 1.2.1.3
costs 1.4.7.6
dead load 1.1.7.1
existing bridges 1.4.7.5
footing depths at railroads 1.1.3.1
footing plan details 2.7.3.7
on structures (general) 1.4.7.1
plan & elevation details 2.6.1, 2.7.3.1
special considerations 1.4.7
structure typr 1.1.2.9
supports 1.4.7.1, 1.4.7.3
under end panels 1.4.7.3

Utility attachments
mechanical anchors 1.4.7.5
resin bonded anchors 1.4.7.5

V

W

Wales
cofferdams 1.4.9.6

Walkways
inspection and maintenance 1.4.4.2
steel girder 1.2.1.3, 1.4.4.2
utilities 1.4.7.6

Washers
load indicator 1.1.23.3, 1.1.24.1

Water
blasting 1.1.20.5
drains 1.1.8.11, 1.1.15.7, 1.1.20.3
level in cofferdams 1.4.9.6
quality 1.1.20.3
removal from cofferdam 1.4.9.6

Water elevation
high designation 1.1.2.2, 1.4.9.6, 2.7.3.3
low designation 2.7.3.3

Water intrusion
deck overlay 1.1.20.5
seal concrete 1.4.9.6
sheet piles 1.4.9.6

Water level
cofferdam 1.4.9.6

Water lines
structure considerations 1.1.15.7, 1.4.7.4

Water pressure
seals 1.4.9.6

Waterproof membrane
- corrosion protection 1.1.25.3
- deck overlays 1.1.20.5
- general 1.1.25.4
- timber structures 1.3.2

Waterproofing
- deck 1.1.20.1
- deck overlays 1.1.20.5
- membranes 1.1.25.4
- precast members 1.1.25.3

Waterway Opening
- bridge length 1.1.2.2
- clearance (walkways) 1.4.4.2

Wave Equation
- general 1.1.5.1, A2.7.3

Wearing surface
- camber 1.1.17.1
- dead loads 1.1.7.1
- deck 1.1.20.1
- end panels 1.1.2.7
- membranes 1.1.25.4
- overlays 1.1.20.5
- precast members 1.1.25.3
- structure types 1.1.2.4
- timber decks 1.3.2

Web
- bearing stiffeners 1.2.15
- connection 1.2.2.2
- fillets 1.1.15.9
- forces 1.1.16.1
- gusset attachment 1.2.1.3
- intermediate stiffeners 1.2.1.4
- pour schedule 1.1.18.4
- splices 1.2.1
- steel girder (general) 1.2.1
- stiffeners 1.2.1.4
- supported deck forms 1.4.4.3

Welding
- A706 reinforcing 1.1.9.6, 1.1.13.1, 1.2.2.1
- bearing stiffeners 1.2.1.5
- CAD symbols 2.2.5
- flanges 1.2.1
- general 1.2.2
- gusset plates 1.2.1.3
- reinforcing detail 1.1.9.6
- shop drawings 1.2.2.1
- special provisions 1.2.2.1
- specialist 1.2.2.1
- spiral reinforcing 1.1.9.6, 1.2.2.1
- stiffeners 1.2.1.3
- web 1.2.1, 1.2.2.2, 1.2.2.4

Welds
- butt 1.2.1.1
- detailing 1.2.2.1, 2.2.3
- fillet 1.2.2.2
- fillet detailing 2.2.5
- flange 1.2.1, 1.2.2.3
- reinforcing 1.1.9.6, 1.2.2.1
- stiffener 1.2.1.3
- structural 1.2.2.1
- web 1.2.1, 1.2.2.2

Widenings
- bents 1.1.8.4
- cast-in-place 1.1.15.10
- corrosion protection 1.1.25.3
- drainage 1.1.20.3
- general 1.1.2.4
- interior bents 1.1.9.3
- precast beams 1.1.14.2
- protective screening 1.4.4.5
- rail retrofits 1.1.21.2
- rail selection 1.1.21.1
- beam 1.1.14.2
- seismic design 1.1.10.1
- structure type 1.1.2.4
- temporary bracing 1.2.1.12

Wingwalls
bridge lengths 1.1.8.1
construction 1.1.8.3
end panels 1.1.2.7
locations..... 1.1.8.2
rail support 1.1.21.1
reinforcing design 1.1.8.3
special provisions 1.1.8.3
substructure choices..... 1.1.2.5
translation stiffness coefficients..... 1.1.4.2

X

Y

Z