

# ROAD DESIGN MANUAL

## INDEX

### A

	<b>PAGE</b>
Abbreviations .....	1B-1, 1B-17
Acceleration Lanes .....	APPEN. F-57
Access, Limited.....	2E-42
Access Management Concepts .....	APPEN. F-6
Accessible Parking Spaces .....	APPEN. C-43, C-49M
Accident Records .....	APPEN. A-48, A-52M
Additional Data-Requesting.....	2A-5
Additional Survey Data .....	2E-83
Administration Approval.....	2A-3
Advertisement.....	2G-21
Aggregate Base Material.....	2G-9
Airport Coordination.....	APPEN. A-108,A-76M
Approval of Noise Study .....	APPEN. C-50
Approval of Project Plans .....	2F-9, 2G-21
Approved Plans to Scheduling & Contract Division for (final) Submission.....	2G-21
Approval Process For Roundabouts .....	APPEN. C-25, C-25M
Areas for Entrance Gutter - Standard CG-9D.....	APPEN. D-34
Areas and Quantities .....	2D-19
Arranging Field Review (On-Site).....	2A-8
Assembling Additional Available Data.....	2A-6
Assembling Photographs and Mapping .....	2A-7
Availability of Plans.....	2B-10

### B

Barrier Type Selection .....	APPEN. A-31, A-34M
Bearings.....	2C-6
Bench Marks and Permanent Turning Points .....	2C-10
Berm Ditch Locations .....	2E-11
Bicycle Facility Guidelines .....	2E-31, APPEN. A-74, A-75M
Bid Proposal .....	2G-19
Biddability Review.....	2G-20
Borrow Material.....	2E-1
Box Culvert "D" Numbers .....	2E-58
Bridges.....	2D-26, 2E-82, APPEN. A-43, A-47M
Bridge Approach Slabs.....	2E-11
Bridge Identification Numbers .....	2E-56
Bridge Only Contract .....	2G-18
Building Data Report .....	2F-2

### C

Cable Guardrail.....	APPEN. A-37, A-41M
Capacity Analyses .....	2B-4, 2C-12, 2D-9, APPEN. B(1)-2
Capital Outlay Code .....	2E-53
Cattle Passes.....	2E-33
Certification Acceptance.....	2A-2
Check for Accuracy and Completeness.....	2F-1, 2G-13
Checklist-Quality Control.....	1E-2
Checklist For Site Plan Completeness.....	APPEN. C-84
Chord Points (TC-5.01) .....	See Road and Bridge Standards
Clear Zone .....	2E-21, APPEN. A-17, A-17M
Clear Zone Guidelines.....	APPEN. A-17, A-17M

	<b>PAGE</b>
Clear Zone Cost-Effectiveness Analysis.....	APPEN. A-21, 21M
Coal Tar Pitch Emulsion.....	2G-9
Collector & Arterial Roadways.....	APPEND. B(1)-5
Commercial Entrances.....	APPEN. F-65
Commercial Entrance Channelization Island Options.....	APPEN. F-73
Commercial Entrance Designs along Highways with Shoulders.....	APPEN. F-80
Commercial Entrance Designs along Highways with Curb and Gutter.....	APPEN. F-81
Commercial Entrance Designs along Highways with Shoulders at Intersection.....	APPEN. F-82
Commercial Entrance Designs along Highways with Curb and Gutter at Intersection.....	APPEN. F-83
Commercial Entrance Designs along Highways with Shoulders (Fast Food, Service Station).....	APPEN. F-84
Commercial Entrance Location Criteria.....	APPEN. F-68
Commercial Entrance Sight Distance.....	APPEN. F-70
Commercial Entrance Spacing.....	APPEN. F-71
Compliance With Federal Regulations.....	2F-3
Complete Surveys.....	2B-2
Concurrent Engineering Process.....	1D-1
Conducting The Public Hearing.....	2D-28
Connections.....	APPEN C-23, C-23M
Constructability.....	APPEN. A-164, A-106M, 2B-9
Constructability Quality Review.....	2B-9, 2D-27, 2E-77 & 2G-15, APPEN. E-1
Construction Areas.....	1C-1
Construction of Cattle Passes.....	2E-33
Construction Cost Estimate.....	2E-76, 2G-14
Construction Easements.....	2E-38
Construction Limits.....	2D-25
Construction Plan Revision.....	2G-23
Construction Plans.....	2G-1
Construction Quantities.....	2F-5
Construction Type Codes.....	2E-60
Contact with Construction Personnel.....	2G-22
Contacting Local Government and/or Agencies.....	2A-10
Contents of Study Reports.....	2D-2
Coordinating Time Schedules.....	2C-2
Coordination With Environmental Division.....	2B-3
Coordination With Other Divisions and Agencies.....	2B-3, 2B-6
Coordination With Other State Agencies.....	2B-3
Corner Clearance Downstream on a Minor Side Street.....	APPEN. F-71
Correspondence Files.....	2A-4, 2G-25
Cost Estimate.....	2B-8, 2E-76, 2F-6, 2G-14
Counties and Municipalities.....	1C-1
Crest and Sag Vertical Curves.....	2D-14
Criteria for Placement of Right Of Way Monuments.....	APPEN. C-52
Cross Sections and Earthwork Quantities.....	2D-18
Crossover Grades.....	APPEN. C-2, C-2M, APPEN. F-33
Crossover Location Approval Process.....	APPEN. F-32
Crossover Spacing.....	APPEN. C-1, C-1M
Crossovers Without and With Connections.....	APPEN. C-23, C-23M
Crusher Run Aggregate.....	2G-9
Cul – De – Sacs and Turnarounds.....	APPEN. B(1)-22
Curb and Gutter.....	2E-13
Curb.....	2E-14
Curb Cut Ramps (CG-12).....	2E-33
Curve Data.....	2C-6
<b>D</b>	
Data For Environmental Document.....	2B-7
Data Required For Plan Coordination Review.....	2G-18
Data Required From Project Manager (Ground surveys & R/W Authorization).....	2B-2, 2D-4, 2F-7
Data To Be Submitted (Environmental Evaluation).....	2B-7
Definitions of Highway Terms.....	1B-6

	<b>PAGE</b>
Demolition of Buildings and Clearing of Parcels .....	2G-10
Demolition of Pavement - Obscuring Old Road .....	2E-32
Depicting Bridges on Plans .....	2E-35
Depicting Drainage on Plans .....	2E-7
Depicting Horizontal Alignment on Plans .....	2D-10
Depicting Tentative Design on Plans .....	2C-11
Depicting Vertical Alignment on Plans .....	2D-14
Description .....	2E-55
Design Approval .....	2D-31
Design Exceptions .....	2A-11, 2D-16, APPEN. A-3, A-3M
Design Features .....	APPEN. C-1, C-1M
Design Features Note .....	2E-75
Design or Combined Location and Design Public Hearing .....	2D-2
Design Requirements – Subdivision Street Design Guide .....	APPEN. B(1)-2
Design Speed .....	APPEN. A-2, A-56M, A-52, A-2M
Design Waivers .....	APPEN. A-3, A-3M, 2A-11, 2D-16
Design Traffic Volumes .....	APPEN. A-51, A-56M
Designing Drainage .....	2E-7
Determination of Roadway Design .....	2B-4
Determining Approximate Length of Bridge .....	2E-35
Determining Approximate Width of Bridge .....	2E-35
Determining Areas and Quantities .....	2D-19
Determining Clear Zone Width .....	APPEN. A-19, A-19M
Determining Construction Quantities .....	2B-8, 2F-5
Determining Project Limits .....	2D-23
Determining Right of Way and Utility Limits .....	2D-23
Determining Width of Pavement .....	2D-19
Detours (Diversions) .....	2G-11
Distribution of Copies of Permit Applications .....	APPEN. C-70
Distribution of Prints .....	2D-31, 2E-84, 2F-9
District Projects .....	2F-10
Districts and Residencies .....	1C-1
Double (Dual) Left Turn Lanes .....	APPEN. C-20, C-20M
Draft EIS .....	APPEN. C-48
Drainage-Box Culvert Numbers .....	2E-58
Drainage Design .....	2E-7
Drainage Summary .....	2G-7
Drawing Requirements for Permits .....	APPEN. C-60

## E

Earthwork .....	2D-19
Elements of Typical Section – Subdivision Street Design Guide .....	APPEN. B(1)-20
Embankment Slopes .....	A-23
End Sections for Pipe Culverts .....	2E-9
Engineer .....	2D-8
Engineering Commentary .....	2D-8
Entrances .....	2D-21, APPEN. A-37, A-40M, APPEN. B(1)-27, APPEN. C-38, C-46M, APPEN. F-63
Entrance Connections on Opposite Sides of a Roadway .....	APPEN. F-74
Entrance Consolidation (Shared Use Entrances) .....	APPEN. F-75
Entrance Design Principles .....	APPEN. F-63
Environmental Concerns .....	2B-3, 2B-6, APPEN. A-50, A-54M, APPEN. C-48
Establishing Priorities (Coordinating Time Schedules) .....	2C-2
Estimating Quantities - Preparation of Estimate .....	2E-76
Evaluating Alternatives .....	2A-9
Evaluating Public Involvement Program .....	2A-10
Evaluation - Post Construction Review .....	2G-28
Exceptions .....	APPEN. A-3, A-3M
Extension of Existing Pipe .....	2E-11

## F

	<b>PAGE</b>
Federal Regulations .....	2F-3
Federally Owned Properties .....	2E-43
Fence .....	2E-20
FHWA Approval .....	2D-32
Field Inspection .....	2E-80
Field Inspection Prints .....	2B-10
Field Review .....	2A-8
Field Reconnaissance .....	2C-4
Final Environmental Document .....	2D-32
Final Environmental Impact Statement (EIS) .....	APPEN. C-49
Final Estimate .....	2G-27
Final Notebook .....	2G-25
Final Preparation of Plans For Construction .....	2G-18
Final Scoping .....	2A-11
Final Scoping Certification .....	2D-33
Final Submission .....	2G-21
Finalizing Plans .....	2G-1
Fixed Objects .....	APPEN. A-36, A-39M
Formal Construction Revisions .....	2G-23
Formal Revisions - Major Changes .....	2F-11
Frontage Road (Service Road) .....	2C-11, APPEN. F-77
Functional Classification .....	2E-59, APPEN. A-3, A-4M, APPEN. B(1)-2, APPEN. F-7
Functional System Characteristics .....	APPEN. F-11
Future Construction (Project Termini) .....	2D-25

## G

General Construction Notes and Erosion and Siltation Control Narrative .....	APPEN. C-70
Geometric Design Standards .....	APPEN. A-1, A-1M
Government Stream Gaging Stations .....	2G-18
Grading Contours .....	2E-33
Grading Diagram & Summary .....	2G-6
Greenways .....	2E-31
Ground Surveys .....	2B-1
Guardrail .....	2E-21, APPEN. A-29, A32M

## H

Highway Capital Outlay Code .....	2E-53
Highway Terms .....	1B-6
Holding the Field Inspection .....	2E-80
Horizontal Alignment .....	2A-9, 2B-5
Hydraulic Commentary For Permit Applications .....	APPEN. C-69
Hydraulics (Preliminary) .....	2B-3
Hydraulics Coordination .....	2C-4
Hydrologic Data Sheet .....	2E-72

## I

Identification (Plan & Profile Sheets, Items) .....	2C-5, 2C-9, 2D-9, 2E-53
Illustration of Directional Median Opening for Left Turns and U-Turns .....	APPEN. F-52
Impact Attenuators (Crash Cushions) .....	APPEN. A-41, A-44M
Incidental Items .....	2E-13
Incidental Items (Labeling) .....	2E-32
Incidental Summary .....	2G-10, 2G-33
Incorporating Changes into Plans .....	2B-11
Incorporating Comments into Design .....	2C-13
Index of Sheets .....	2E-61
Informal Revisions - Minor Changes .....	2F-13
Informational Brochure and Data for Environmental Document .....	2D-2
Initial Design .....	2C-11

	<b>PAGE</b>
Innovative Design Proposals – Subdivision Street Design Guide .....	APPEN. B(1)-53
Integrated Project Manager .....	2F-5, 2G-1,2G-13
Items Not in Contract .....	2F-3
Interchange Design .....	APPEN.A-16, A-16M, 2B-4
Intersecting Cross Road Grades .....	APPEN. C-4, C-4M, APPEN. F-34
Intersection Design .....	APPEN. C-23, C-23M, APPEN. F-12
Intersection Design Objectives .....	APPEN. F-12
Intersection Design Principles .....	APPEN. F-13
Intersection Sight Distances .....	APPEN. F-30
Interstate .....	2B-1
Interstate and Primary Projects .....	2A-2

## L

Labeling Incidental Items .....	2E-32
Layout .....	2C-5, 2E-54
Left and Right Turn Lane Criteria .....	APPEN. F-36
Left Turn Lanes .....	APPEN. C-4, C-4M
Limited Access Lines - Right of Way .....	2E-42
Limits of Maintenance Responsibility for Private and Commercial Entrances .....	APPEN. F-78
Load Carrying Grate .....	2E-10
Local Roadways .....	APPEN. B(1)-5
Location Map .....	2E-65
Location Public Hearing .....	APPEN. C-49
Location Corridor Study .....	2A-1

## M

Match lines .....	2C-6
Median Barriers .....	APPEN. A-42, A-46M
Medians .....	2E-14, APPEN. F-50
Median Openings/Crossovers .....	APPEN. F-32
Metes and Bounds Description .....	2E-43
Minimum Angle of Intersections .....	APPEN. F-21
Minimum Plan Projects .....	APPEN. A-112, A-81M
Minor Structure Excavation .....	2E-8
Minor Structure Excavation (Ratio) .....	APPEN. D-17
Mountable Curb .....	2E-33

## N

No Plan Projects .....	APPEN. A-112, A81M
Noise Abatement .....	APPEN. C-48
Nomenclature .....	1B-1
Non-Recoverable Parallel Slopes .....	APPEN. A-27, A-30M
Non-Standard Roadside Ditches .....	2E-8
North Arrow .....	2C-7
Notes .....	2E-59
Notice of Willingness to Hold Public Hearing .....	2D-6
Numbers - Parcels and Buildings .....	2F-1
Numbering (Plan & Profile Sheets) .....	2C-5, 2C-9

## O

Obtaining Administrative Approval .....	2D-31
Obscuring Old Roadway .....	2E-32
Original Right Of Way Plans .....	2F-9
Other Design Considerations – Subdivision Street Design Guide .....	APPEN. B(1)-39
Outdoor Advertising Signs on Plans .....	2F-3

**P**

	<b>PAGE</b>
Parcel Numbers and Building Demolition Numbers .....	2F-1
Parking Spaces.....	APPEN. C-41, C-49M
Pavement Cross Slopes.....	APPEN. A-59, A-64M, 2E-70
Pavement Recommendations .....	2D-26
Pavement Summary.....	2G-7, 2G-33
Pavement Termination .....	2D-24
Pedestrian Ramps .....	2E-33
Permanent Easements.....	2E-38
Permit Application Procedure.....	APPEN.C-56
Permit Assembly.....	2F-5
Permit Determination.....	2B-6
Permit Sketches and Procedure .....	APPEN. C-55
Pipe Endwalls with Load Carrying Grate.....	2E-10
Plan Abbreviations and Symbols .....	1B-17
Plan Assembly (Field Inspection).....	2E-78
Plan Library.....	2G-24
Plan Operation - Post Construction Review.....	2G-28
Plan Revisions .....	2E-52, 2F-11, 2G-23
Plans Prepared by Other Divisions .....	2G-4
Plotting Construction Limits .....	2D-25
Plotting Cross Sections .....	2D-18
Plotting Edges of Pavement.....	2D-21
Plotting Entrances and Crossovers.....	2D-21
Plotting of Profile Sheets .....	2C-8
Policy - Final Scoping.....	2A-11
Post-Certification Plan Changes .....	2G-18
Post Construction Review .....	2G-28
Pre-advertisement Meeting .....	2G-17
Predetermined Design.....	2C-11
Pre-hearing Meeting.....	2D-5, 2D-28
Preliminary Design .....	2C-1
Preliminary Engineering (Authorization).....	2A-1
Preliminary Field Inspection .....	2B-10
Preliminary Plan Development.....	2A-5
Preparation of Construction Cost Estimate.....	2G-14
Preparation and Processing of Public Hearing Data .....	2D-4
Preparation of Engineering Commentary.....	2D-8
Preparation of Final Estimate .....	2G-27
Preparation of Inspection Reports.....	2B-11
Preparation of Plan and Profile Sheets .....	2C-5
Preparation of Project Cost Estimate and Report.....	2B-11, 2F-6
Preparation of Report .....	2A-10
Preparation of Study Reports & Informational Brochures.....	2D-2
Principal Abbreviations .....	1B-1
Principal-Minor Arterial .....	2B-1
Private Entrance Detail.....	APPEN. F-64
Private Entrances (Existing State Highways).....	APPEN. F-64
Procedure for the Public Hearing .....	2D-28
Processing Data to Public Involvement Section .....	2D-30
Processing of Plan Revisions.....	2F-12
Profiles .....	2C-9
Project Approval .....	2D-31, 2F-9, 2G-19
Project Assignment and Field Reconnaissance .....	2C-4
Project Development .....	APPEN. A-51, A-55M, 1D-1
Project Final Scoping Certification .....	2D-33
Project Initiation .....	2A-1

	<b>PAGE</b>
Project Length Tabulation .....	2E-55
Project Limits .....	2D-23
Project Location Map .....	2E-65
Project Management .....	2C-4
Project Numbers .....	2C-5, 2E-53
Project Review .....	2C-1, 2D-1
Project Scoping .....	2A-11
Projected Traffic .....	APPEN. B(1)-2
Projecting Horizontal Alignment .....	2A-9
Projecting Vertical Alignment .....	2A-9
Proposed Conveyances of Residue Parcels .....	2F-13
Proposed Right Of Way and Limited Access .....	2E-36
Public Hearing Data .....	2D-26
Public Involvement Program .....	2A-10
Public Involvement Section .....	2D-30
Publishing Notice of the Public Hearing .....	2D-7
Pug Mill Mix Aggregates .....	2G-8
Purpose and Scope - Post Construction Review .....	2G-28

## Q

Quantity Totals .....	2E-76
Quality (Review) .....	1E-1
Quality Control Checking Procedure .....	2G-16
Quality Control Checklist .....	1E-2

## R

Railroads-Highway Construction Adjacent to Railway Tracks .....	2E-29
Railroads in Virginia .....	1B-23
Ratios for Minor Structure Excavation .....	APPEN. D-17
Recommendation for Approval .....	2F-9
Recommending a Solution .....	2D-30
Reference Block .....	2C-7
Reference Points .....	2C-7
Refining Horizontal Alignment .....	2B-5, 2D-10
Refining Vertical Alignment .....	2B-5, 2D-13
Removal of Bridge Approaches .....	2E-11
Removal of Existing Pipes .....	2E-11
Reports - Post Construction Review .....	2G-28
Request for Additional Survey Data .....	2E-83
Request for Appropriate Environmental Document .....	2B-7
Request for Approval of Major Design Features .....	2D-32
Request for Cost Estimates .....	2B-8, 2F-6
Request for Environmental Evaluation .....	2B-7
Request for Hydraulic Evaluation .....	2B-3
Request for Public Hearing .....	2D-7
Request for Right Of Way Authorization from FHWA .....	2F-7
Request for Soils Data (Preliminary) .....	2B-3
Request for Sound Wall Design .....	2E-82
Request for Special Design Plans .....	2E-81
Request for Supplemental Data .....	2D-26
Request for Traffic Data .....	2A-6
Requesting Photographic Coverage/Topographic Mapping .....	2A-7
Resolution of Borrow/Surplus and Unsuitable Material .....	2E-1
Resolution of Pending Construction Details .....	2G-1

	<b>PAGE</b>
Resolution of Public Hearing Questions.....	2D-30
Responsibility of the Public Involvement Section.....	2D-4
Restricted Vertical Clearances.....	2D-13
Retaining Walls.....	2E-22
Retention of Design Files.....	2G-25
Review of Correspondence.....	2C-3
Review of Data-Setting Up Files.....	2C-3
Review of Draft Environmental Document.....	2D-2
Review of Plans.....	2F-1, 2G-13
Review of Public Hearing Transcript and Post-Hearing Correspondence.....	2D-30
Review of Work Load (Coordinating Time Schedules).....	2C-2
Review Process - Post Construction Review.....	2G-28
Reviewing and Setting Up Route File (Electronic).....	2C-3
Reviewing Reports.....	2G-1
Reviewing The Proposed Method of Development.....	2B-11
Reviewing Work Load and Assembling Data.....	2A-4
Revision Data Sheet.....	2G-23
Revisions (Construction).....	2G-23
Right Of Way.....	2C-8, 2E-36, APPEN. C-50
Right Of Way Data Sheet.....	2E-65, 2F-1
Right Of Way Monuments.....	APPEN. C-51
Right Of Way Note on Title Sheet.....	2G-13
Right Of Way Plans.....	2F-1, 2F-10
Right Of Way Revisions.....	2F-11
Right Turn Lanes.....	APPEN. C-34, C-42M, APPEN. F-53
Road and Street Names.....	2C-8
Roadside Development.....	2G-10
Roadway Geometric Design Criteria – Subdivision Street Design Guide.....	APPEN. B(1)-5
Roundabouts.....	APPEN. B(1)-47, APPEN. C-24, C-24M, APPEN. F-35
Route Files.....	2A-4, 2C-3, 2G-25
RRR Projects.....	APPEN. A-45, A-49M
Run-On Terminals.....	2E-21
Rural Roadway Design.....	APPEN. A-5, A-5M

## S

Safety Items and Sequence of Construction.....	2E-80
Safety Projects.....	APPEN. A-43, A-47M, APPEN. C-81
Safety Rest Areas.....	APPEN. C-40, C-48M
Sag Vertical Curve.....	2D-14, APPEN. A-58, A-63M
Scale.....	2C-7
Scheduling Preliminary Field Inspection.....	2B-10
Scheduling Project with Work Load.....	2A-4
Scheduling the Public Hearing.....	2D-7
Scoping Group.....	2A-11
Scoping Process.....	2A-11
Secondary Projects.....	2B-2, APPEN. A-43, A-47M
Secondary Roads (Arterial-Collector-Local Roads).....	2B-2
Security of Estimates.....	2E-76
Separate Right Of Way Plans.....	2E-43
Sequence of Construction.....	2E-80, APPEN. A-143, A-82M
Service Roads.....	2C-11, APPEN. A-15, A-15M
Setting Project Termini.....	2D-23
Setting Up Correspondence Files (Electronic).....	2A-4, 2C-3
Setting Up Route Files.....	2A-4, 2C-3
Shared Entrances and Internal Site Interconnection.....	APPEN. F-75
Sheet Numbers.....	2E-61
Showing Bridge Limits.....	2E-35
Shyline.....	2E-21
Sidewalk.....	2E-29
	<b>PAGE</b>
Sight Distance.....	APPEN. A-58, A-63M, APPEN. C-31, C-39M, APPEN. B(1)-18
Signalized Intersection Spacing.....	APPEN. F-21



Signs .....	2F-3
Sign Islands .....	2E-29
Site Plan Review.....	APPEN. C-84
Site Plans.....	2C-8
Skew Angle of Drainage Structure .....	2E-12
Slope Easement .....	2E-37
Slopes For Approach Barriers.....	APPEN. A-35, A-38M
Soil Data (Final) .....	2E-1
Soil Data (Preliminary).....	2B-3
Soil Survey and Pavement Design.....	2E-1
Soliciting Comments Within Division and Completing Design.....	2C-13
Sound Barrier Wall Design Procedure .....	2E-27
Spacing Standards for Commercial Entrances, Intersections, & Crossovers .....	APPEN. F-25
Spacing Standards for Commercial Entrances, Intersections Near Interchange Ramps on Principal Arterials .....	APPEN. G-27
Special Design Bridges.....	APPEN. G-27
Special Design Drawings.....	2E-81, 2G-2
Specialty Summaries.....	2G-10
Staking For Concrete Items.....	2E-16
Standard JB-1 Junction Box.....	APPEN. D-16
Standard Private Subdivision Road/Street Entrance .....	APPEN. F-79
Steps and Handrails .....	2E-28
Stippling .....	2D-23
Stone for Erosion Control .....	APPEN. D-1
Stopping Sight Distance .....	APPEN. F-29
Stormwater Management.....	2G-10
Street Names.....	2C-8
Studying Alternate Solutions .....	2A-9, 2D-30
Subbase End Areas at Curb and Gutter Locations.....	APPEN. D-33
Subdivision Street Design Guide.....	APPEN. B(1)-1
Submission of Plan Assembly.....	2F-7, 2G-23
Summary Sheets .....	2G-5
Supplemental Sheets .....	2E-53
Surplus Material.....	2E-1
Survey Authorization .....	2B-1
Survey Baseline.....	2C-6
Systems Operations Regions.....	1C-8

## T

Temporary Detours.....	2G-11
Temporary Easement (Construction).....	2E-39
Temporary Traffic Control Plans .....	APPEN. A-149, A-88M
Terminals .....	APPEN. A-35, A-41M
Terrain.....	APPEN. B(1)-4
Title Sheet.....	2E-53
Topographic Mapping.....	2A-7
Topography.....	2C-7
Tort Liability.....	APPEN. A-66, A-71M
Traditional Neighbor Design – Subdivision Street Design Guide .....	APPEN. B(1)-53
Traffic Barriers .....	2E-21, APPEN. A-32M, A-29
Traffic Calming – Subdivision Street Design Guide .....	APPEN. B(1)-45
Traffic Data .....	2A-6
Transition Curves (TC-5.01).....	See <u>Road and Bridge Standards</u>
Transitions and Turn Lanes.....	APPEN. B(1)-6
Tree Walls and Tree Wells .....	2E-32
Turning Lanes.....	APPEN. F-36
Type Codes .....	2E-60
Types of Permits.....	APPEN. C-56
Typical Section Sheet.....	2E-71

**U**

Underdrains .....2E-31  
 Underground Storage Tanks ..... 2F-2  
 Unsignalized Intersection Spacing .....APPEN. F-24  
 Unsuitable Material .....2E-1  
 Updating Plan Identification .....2D-9  
 Urban Roadway Design .....APPEN. A-11, A-11M  
 Urban and Rural Area Definitions .....APPEN. F-10  
 Urban Surveys .....2B-1  
 Urban and Secondary Projects .....2D-4  
 Urban Projects .....2A-1  
 Utilities.....2C-7, 2G-11  
 Utility Adjustments .....2G-11  
 Utility Easements .....2E-39  
 Utility Field Inspection.....2E-85

**V**

Value Engineering .....2B-12  
 Vertical Alignment..... 2A-9, 2B-5, 2D-13  
 Vertical Clearance .....2D-13

**W**

Warrants for Left Turn Storage Lanes on Four-Lane Highways.....APPEN. F-38  
 Warrants for Left Turn Storage Lanes on Two-Lane Highways ..... APPEN. C-7, C-7M, APPEN. F-39  
 Water Related Permits ..... APPEN. C-55  
 Wells ..... 2F-2  
 Weights of Asphalt Concrete.....2G-9  
 Widths, Roadway and Travelway .....APPEN. A-51, A-55M