

# ROAD DESIGN MANUAL

## INDEX

### A

	PAGE
Abbreviations.....	1B-1, 1B-17
Acceleration Lanes.....	APPEN. F-73
Access, Limited .....	2E-44
Access Management Concepts.....	APPEN. F-7
Accessible Parking Spaces .....	APPEN. C-4, C-4M
Accessible Routes.....	APPEN. A-110
Accident Records .....	APPEN. A-52, A-52M
Accommodating Pedestrians and Bicyclists.....	APPEN. F-44
Additional Data-Requesting .....	2A-5
Additional Survey Data .....	2E-87
Administration Approval .....	2A-3
Advertisement .....	2G-21
Aggregate Base Material .....	2G-9
Airport Clearance Requirements .....	APPEN. A-127, A-76M
Approval of Noise Study .....	APPEN. C-11
Approval of Project Plans.....	2F-9, 2G-21
Approved Plans to Scheduling & Contract Division for (final) Submission.....	2G-21
Approval Process For Roundabouts .....	APPEN. F-41
Areas for Entrance Gutter - Standard CG-9D .....	APPEN. D-34
Areas and Quantities.....	2D-19
Arranging Field Review (On-Site).....	2A-8
"As-Built" Plans.....	2G-26
Assembling Additional Available Data .....	2A-6
Assembling Photographs and Mapping.....	2A-7
Availability of Plans .....	2B-10

### B

Barrier Type Selection.....	APPEN. A-35, 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-75, A-75M
Bid Proposal .....	2G-19
Biddability Review .....	2G-20
Borrow Material .....	2E-1
Box Culvert "D" Numbers.....	2E-60
Bridges .....	2D-26, 2E-86, APPEN. A-47, A-47M
Bridge Approach Slabs .....	2E-11
Bridge Identification Numbers.....	2E-58
Bridge Only Contract.....	2G-18
Buffer Strips.....	APPEN. A-111, A-116
Building Data Report .....	2F-2

### C

Cable Guardrail .....	APPEN. A-41, A-41M
Capacity Analyses.....	2B-4, 2C-12, 2D-9, APPEN. B(1)-2
Capital Outlay Code .....	2E-57
Cattle Passes .....	2E-34
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-43
Chord Points (TC-5.01).....	See Road and Bridge Standards
Clear Zone.....	2E-21, APPEN. A-21, A-17M
Clear Zone Guidelines .....	APPEN. A-21, A-17M

	PAGE
Clear Zone Cost-Effectiveness Analysis .....	APPEN. A-25, 21M
Coal Tar Pitch Emulsion .....	2G-9
Collector & Arterial Roadways .....	APPEND. B(1)-5
Commercial Entrances.....	APPEN. F-82
Commercial Entrance Channelization Island Options .....	APPEN. F-91
Commercial Entrance Designs along Highways with Shoulders.....	APPEN. F-99
Commercial Entrance Designs along Highways with Curb and Gutter .....	APPEN. F-100
Commercial Entrance Designs along Local Streets with Curb and Gutter or Shoulders.....	APPEN. F-101
Commercial Entrance Designs along Highways with Shoulders at Intersection.....	APPEN. F-102
Commercial Entrance Designs along Highways with Curb and Gutter at Intersection .....	APPEN. F-103
Commercial Entrance Designs to Serve A Private Subdivision Road / Street.....	APPEN. F- 98
Commercial Entrance Designs to Serve Drive-In Type Businesses .....	APPEN. F-104
Commercial Entrance Location Criteria.....	APPEN. F-86
Commercial Entrance Sight Distance.....	APPEN. F-88
Commercial Entrance Spacing .....	APPEN. F-89
Compliance With Federal Regulations .....	2F-3
Complete Surveys.....	2B-2
Conducting The Public Hearing .....	2D-28
Constructability .....	APPEN. A-180, A-98M, 2B-9
Constructability Quality Review .....	2B-9, 2D-27, 2E-81 & 2G-15,APPEN. E-1
Construction Areas.....	1C-1
Construction of Cattle Passes .....	2E-34
Construction Cost Estimate .....	2E-80, 2G-14
Construction Easements.....	2E-39
Construction Limits.....	2D-25
Construction Plan Revision .....	2G-23
Construction Plans .....	2G-1
Construction Quantities.....	2F-6
Construction Type Codes .....	2E-64
Contact with Construction Personnel .....	2G-22
Contacting Local Government and/or Agencies .....	2A-10
Contents of Study Reports .....	2D-2
Continuous Left-Turn Lanes .....	APPEN. F-63
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-89
Correspondence Files .....	2G-25
Cost Estimate .....	2B-8, 2E-80, F-7, 2G-14
Counties and Municipalities .....	1C-1
Crest and Sag Vertical Curves .....	2D-14
Criteria for Placement of Right Of Way Monuments .....	APPEN. C-13
Cross Sections and Earthwork Quantities.....	2D-18
Crossover Grades .....	APPEN. F-29
Crossover Location Approval Process .....	APPEN. F-29
Crossover Spacing .....	APPEN. F-23
Crusher Run Aggregate .....	2G-9
Cul – De – Sacs and Turnarounds .....	APPEN. B(1)-23
Curb and Gutter.....	2E-13, 2E-33
Curb .....	2E-14, 2E-33
Curb Cut Ramps (CG-12) .....	2E-33, APPEN. 111
Curve Data .....	2C-6

## D

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, 2F-8
Data To Be Submitted (Environmental Evaluation) .....	2B-7
Definitions of Highway Terms .....	1B-6

	PAGE
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-59
Design Approval .....	2D-31
Design-Build Preliminary Engineering Guide .....	H-1
Design Exceptions .....	2A-11, 2D-16, APPEN. A-4, A-3M
Design Features Note .....	2E-79
Design or Combined Location and Design Public Hearing.....	2D-2
Design Requirements – Subdivision Street Design Guide .....	APPEN. B(1)-2
Design Speed .....	APPEN. A-3, A-56M, A-54, A-2M
Design Waivers .....	APPEN. A-4, A-3M, 2A-11, 2D-16
Design Traffic Volumes .....	APPEN. A-54, 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-23, A-27M
Determining Construction Quantities.....	2B-8, 2F-6
Determining Permanent Easements .....	2E-38
Determining Project Limits .....	2D-23
Determining Right of Way and Utility Limits .....	2D-23, 2E-36
Determining Slope Easements .....	2E-37
Determining Surplus Right of Way .....	2E-46
Determining Width of Pavement.....	2D-19
Detours (Diversions) .....	2G-11
Distribution of Copies of Permit Applications .....	APPEN. C-29
Distribution of Prints .....	2D-31, 2E-88, 2F-9
Districts and Residencies.....	1C-1
Double (Dual) Left Turn Lanes .....	APPEN. F-63
Draft EIS .....	APPEN. C-9
Drainage-Box Culvert Numbers.....	2E-60
Drainage Design .....	2E-7
Drainage Summary .....	2G-7
Drawing Requirements for Permits.....	APPEN. C-19

## E

Earthwork .....	2D-19
Elements of Typical Section – Subdivision Street Design Guide .....	APPEN. B(1)-21
Embankment Slopes .....	APPEN. A-27
End Sections for Pipe Culverts .....	2E-9
Engineer .....	2D-8
Engineering Commentary .....	2D-8
Entrances .....	2D-21, APPEN. A-41, A-40M, APPEN. B(1)-28, APPEN. F-79
Entrance Connections on Opposite Sides of a Roadway .....	APPEN. F-92
Entrance Consolidation (Shared Use Entrances) .....	APPEN. F-93
Entrance Design Principles .....	APPEN. F-79
Environmental Concerns.....	2B-3, 2B-6, APPEN. A-53, A-54M, APPEN. C-9
Establishing Priorities (Coordinating Time Schedules) .....	2C-2
Estimating Quantities - Preparation of Estimate .....	2E-80
Evaluating Alternatives.....	2A-9
Evaluating Public Involvement Program.....	2A-10
Evaluation - Post Construction Review .....	2G-28
Exceptions .....	APPEN. F-28. APPEN. A-4, A-3M
Extension of Existing Pipe .....	2E-11

**F**

	<b>PAGE</b>
Federal Regulations .....	2F-3
Fence.....	2E-20
FHWA Approval .....	2D-32
Field Inspection .....	2E-84
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-10
Final Estimate.....	2G-27
Final Notebook .....	2G-26
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-40, A-39M
Flexibility in Design.....	APPEN. A-1, A-1M
Formal Construction Revisions.....	2G-23
Formal Revisions - Major Changes .....	2F-10
Frontage Road (Service Road).....	2C-11, APPEN. F-95
Functional Classification .....	2E-63, APPEN. A-4, A-4M, APPEN. B(1)-2, APPEN. F-8
Future Construction (Project Termini) .....	2D-25

**G**

General Construction Notes and Erosion and Siltation Control Narrative.....	APPEN. C-29
Geometric Design Standards.....	APPEN. A-1, A-1M
Government Stream Gauging Stations .....	2G-18
Grading Contours .....	2E-33
Grading Diagram & Summary .....	2G-6
Greenways .....	2E-31
Ground Surveys .....	2B-1
Guardrail.....	2E-21, APPEN. A-33, A-32M
Guidelines For Curb Ramp Location .....	APPEN. A-123

**H**

Highway Capital Outlay Code .....	2E-57
Highway Terms .....	1B-6
Holding the Field Inspection.....	2E-84
Horizontal Alignment.....	2A-9, 2B-5
Hydraulic Commentary For Permit Applications .....	APPEN. C-28
Hydraulics (Preliminary) .....	2B-3
Hydraulics Coordination.....	2C-4
Hydrologic Data Sheet .....	2E-76

**I**

Identification (Plan & Profile Sheets, Items) .....	2C-5, 2C-9, 2D-9, 2E-57
Illustration of Directional Median Opening for Left Turns and U-Turns .....	APPEN. F-68
Impact Attenuators (Crash Cushions) .....	APPEN. A-45, 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-65
Informal Revisions - Minor Changes .....	2F-12
Informational Brochure and Data for Environmental Document .....	2D-2
Initial Design .....	2C-11

	PAGE
Innovative Design Proposals – Subdivision Street Design Guide .....	APPEN. B(1)-58
Integrated Project Manager .....	2F-6, 2G-1, 2G-13
Items Not in Contract .....	2F-3
Interchange Design .....	APPEN.A-16, A-16M, 2B-4
Intersecting Cross Road Grades .....	APPEN. F-39
Intersection Design .....	APPEN. F-11
Intersection Design Objectives .....	APPEN. F-11
Intersection Design Principles .....	APPEN. F-12
Intersection Sight Distances .....	APPEN. F-34, B(1)-19
Interstate Survey .....	2B-1
Interstate and Primary Projects .....	2A-2
Interstate, Primary, Urban and Secondary Projects.....	2D-4

## L

Labeling Incidental Items .....	2E-32
Layout.....	2C-5, 2E-58
Left and Right Turn Lane Criteria .....	APPEN. F-48
Left Turn Lanes .....	APPEN. F-48
Limited Access Lines - Right of Way .....	2E-44
Limits of Maintenance Responsibility for Private and Commercial Entrances .....	APPEN. F-86
Load Carrying Grate.....	2E-10
Local Roadways.....	APPEN. B(1)-5
Location Map .....	2E-69
Location Public Hearing .....	APPEN. C-10
Location Corridor Study .....	2A-1
Low Volume Commercial Entrance Design Along Highways with Shoulders .....	APPEN. F-105

## M

Match lines .....	2C-6
Median Barriers .....	APPEN. A-46, A-46M
Medians .....	2E-14, APPEN. F-66
Median Openings/Crossovers .....	APPEN. F-36
Minimum Angle of Intersections.....	APPEN. F-18
Minimum Plan Projects .....	APPEN. A-138, A-81M
Minor Structure Excavation .....	2E-8
Minor Structure Excavation (Ratio).....	APPEN. D-17
Mountable Curb.....	2E-33

## N

No Plan Projects.....	APPEN. A-131, A-81M
Noise Abatement.....	APPEN. C-9
Nomenclature .....	1B-1
Non-Recoverable Parallel Slopes.....	APPEN. A-31, A-30M
Non-Standard Roadside Ditches .....	2E-8
North Arrow .....	2C-7
Notes .....	2E-63
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)-41
Outdoor Advertising Signs on Plans.....	2F-3

	PAGE
Parcel Numbers and Building Demolition Numbers.....	2F-1
Parking Spaces .....	APPEN. C-2, C-2M
Pavement Cross Slopes .....	APPEN. A-61, A-64M, 2E-75
Pavement Recommendations .....	2D-26
Pavement Summary .....	2G-7, 2G-33
Pavement Termination .....	2D-24
Pavement Transitions .....	APPEN. A-6
Pedestrian Access Routes.....	A-113
Pedestrian Ramps.....	2E-33
Permanent Easements .....	2E-38
Permit Application Procedure .....	APPEN.C-15
Permit Assembly .....	2F-6
Permit Determination .....	2B-6
Permit Sketches and Procedure .....	APPEN. C-15
Pipe Endwalls with Load Carrying Grate .....	2E-10
Plan Abbreviations and Symbols.....	1B-17
Plan Assembly (Field Inspection) .....	2E-82
Plan Library .....	2G-24
Plan Operation - Post Construction Review .....	2G-28
Plan Revisions.....	2E-57, 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-7
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-81
Private Entrances (Existing State Highways).....	APPEN. F-81
Procedure for the Public Hearing.....	2D-28
Processing of Plan Revisions .....	2F-11
Profiles.....	2D-15, 2C-9
Project Approval.....	2D-31, 2F-9, 2G-19
Project Assignment and Field Reconnaissance.....	2C-4
Project Development.....	2A-1, APPEN. A-53, A-55M
Project Development Process .....	1D-1
Project Final Scoping Certification .....	2D-33
Project Initiation .....	2A-1

	PAGE
Project Length Tabulation .....	2E-59
Project Limits .....	2D-23
Project Location Map .....	2E-69
Project Management .....	2C-4
Project Managers Responsibilities .....	2D-4
Project Numbers .....	2C-5, 2E-57
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-12
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-80
Quality Control(Review) .....	1E-1
Quality Control Checking Procedure .....	2G-16
Quality Control Checklist .....	1E-2

## R

Rails With Trails .....	APPEN. A-108
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-87
Request for Appropriate Environmental Document .....	2B-7
Request for Approval of Major Design Features .....	2D-32
Request for Cost Estimates .....	2B-8, 2F-7
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-8
Request for Soils Data (Preliminary) .....	2B-3
Request for Sound Wall Design .....	2E-86
Request for Special Design Plans .....	2E-85
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

	PAGE
Resolution of Public Hearing Questions .....	2D-30
Responsibility of the Project Manager & the District Public Affairs 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-34
Revisions (Construction).....	2G-23
Right Of Way .....	2C-8, 2E-36, APPEN. C-12
Right Of Way Data Sheet.....	2E-69, 2F-1
Right Of Way Monuments.....	APPEN. C-12
Right Of Way Note on Title Sheet .....	2G-13
Right Of Way Plans.....	2F-1, 2F-10
Right Of Way Revisions .....	2F-10
Right Turn Lanes.....	APPEN. F-69
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)-50, APPEN. F-39
Route Files .....	2C-3, 2G-25
RRR Projects.....	APPEN. A-49, A-49M
Run-On Terminals.....	2E-21
Rural Roadway Design .....	APPEN. A-6, A-7M

## S

Safety Analysis.....	2B-4
Safety Items and Sequence of Construction .....	2E-84
Safety Projects .....	APPEN. A-47, A-47M, APPEN. C-40
Safety Rest Areas .....	APPEN. C-1, C-1M
Sag Vertical Curve .....	2D-14, APPEN. A-59, A-63M
Scale.....	2C-7
Scheduling Preliminary Field Inspection.....	2B-10
Scheduling Project with Work Load .....	2A-4
Scheduling the Public Hearing.....	2D-7
Secondary Projects .....	2B-2, APPEN. A-2, A-47, A-47M
Secondary Roads (Arterial-Collector-Local Roads) .....	2B-2
Security of Estimates .....	2E-80
Sequence of Construction.....	2E-78, APPEN. A-164, A-82M
Service Roads .....	2C-11, APPEN. A-15, A-15M
Setting Project Termini.....	2D-24
Setting Up Correspondence Files (Electronic) .....	2C-3
Setting Up Route Files .....	2C-3
Shared Entrances and Internal Site Interconnection .....	APPEN. F-93
Shared Roadways.....	APPEN. A-88
Shared Use Path.....	APPEN. A-93
Sheet Numbers .....	2E-65
Showing Bridge Limits .....	2E-35
Shyline .....	2E-21
Sidewalk .....	APPEN. A-118, 2E-29

	PAGE
Sight Distance .....	APPEN. B(1)-19
Signalized Intersection Spacing.....	APPEN. F-21
Signs.....	2F-3
Sign Islands .....	2E-29
Site Plan Review .....	APPEN. C-43
Site Plans .....	2C-8
Skew Angle of Drainage Structure .....	2E-12
Slope Easement.....	2E-37
Slopes For Approach Barriers .....	APPEN. A-39, 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-23
Spacing Standards for Commercial Entrances, Intersections Near Interchange Ramps on Principal Arterials .....	APPEN. F-26
Special Design Bridges .....	2G-11
Special Design Drawings .....	2E-85, 2G-2
Specialty Summaries .....	2G-10
Staking For Concrete Items .....	2E-16
Standard JB-1 Junction Box .....	APPEN. D-16
Steps and Handrails.....	2E-28
Stippling.....	2D-23
Stone for Erosion Control.....	APPEN. D-1
Stopping Sight Distance.....	APPEN. A-60, A-63M, APPEN. F-33, B(1)-19
Stormwater Management .....	2G-10
Street Names .....	2C-8
Streetscape .....	APPEN. B(1)-43
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-8, 2G-23
Summary Sheets.....	2G-5
Supplemental Sheets .....	2E-65
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-170, A-88M
Terminals.....	APPEN. A-41, A-41M
Title Sheet .....	2E-57
Topographic Mapping .....	2A-7
Topography .....	2C-7
Tort Liability .....	APPEN. A-67, A-71M
Traditional Neighbor Design – Subdivision Street Design Guide .....	APPEN. B(1)-56
Traffic Barriers .....	2E-21, APPEN. A-33, A-32M, A-36
Traffic Calming – Subdivision Street Design Guide .....	APPEN. B(1)-48
Traffic Data .....	2A-6
Trails and Trailheads.....	APPEN. A-106
Transition Curves (TC-5.01) .....	See <u>Road and Bridge Standards</u>
Transitions and Turn Lanes .....	APPEN. B(1)-6, APPEN. F-52
Tree Walls and Tree Wells.....	2E-32
Turning Lanes .....	APPEN. F-47
Type Codes .....	2E-64
Types of Permits .....	APPEN. C-15
Typical Section Sheet .....	2E-75

**PAGE**

<b>U</b>	
Underdrains.....	2E-31
Underground Storage Tanks .....	2F-2
Unsignalized Intersection Spacing .....	APPEN. F-23
Unsuitable Material .....	2E-1
Updating Plan Identification .....	2D-9
Urban Roadway Design.....	APPEN. A-12, A-11M
Urban Surveys.....	2B-1
Urban Projects.....	2A-1
Utilities .....	2C-7, 2G-11
Utility Adjustments.....	2G-11
Utility Easements.....	2E-41
Utility Field Inspection .....	2E-89
<b>V</b>	
Value Engineering.....	2B-12
Vertical Alignment .....	2A-9, 2B-5, 2D-13
Vertical Clearance.....	2D-13
<b>W</b>	
Warrants for Left Turn Storage Lanes on Four-Lane Highways.....	APPEN. F-49
Warrants for Left Turn Storage Lanes on Two-Lane Highways .....	APPEN. F-50
Water Related Permits.....	APPEN. C-15
Wells.....	2F-2
Weights of Asphalt Concrete .....	2G-9
Widths, Roadway and Travelway .....	APPEN. A-53, A-55M