ENGINEERS AND SURVEYORS INSTITUTE
"A public/private partnership"
LOUDOUN COUNTY, VIRGINIA
MINIMUM SUBMISSION REQUIREMENTS

CONSTRUCTION PLANS AND PROFILES

PROJECT NAME & NUMBER: _____

SUBMITTING FIRM: _____ PHONE #: _____

PROJ. COORD: _____ E-MAIL ADDRESS: _____

DPE NAME: _____ DPE#: _____ E-MAIL ADDRESS: _____

REVIEW DATE: _____ ESI REVIEW TEAM: _____

Note: The following sheets and information are required for every submission. Additional sheets and information should be provided where necessary to demonstrate compliance with County requirements or conditions of approval. Peer Review dates are determined by Loudoun County Staff once the plan has been submitted following an acceptable MSR review. (Column abbreviations: AD = Addressed; RR = Revisions Required; N/A = Not Applicable)

FSM CHAPTER 8.101 AND 8.106

Code Reference	Description	Sheet	AD	RR	N/A	Line
FSM 8.101.A.1	Scale					1
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FSM 8.101.A.3	Revision block					3
FSM 8.101.A.4	Source of title					4
FSM 8.101.A.5	Applicable Zoning ordinance and requirements					5
FSM 8.101.A.6	Associated land dev. app. info – Nos. & appr. date					6
FSM 8.101.A.7	Vicinity map, Scale 1" = 2000' max; Site Location; north arrow, perimeter bound. line, adjoining rds w/ names & nos., Town bound. lines w/in 1 mile of subdivision					7
FSM 8.101.A.8	Coordinate grid ticks (min 3) labeled on plan sheets					8
FSM 8.101.A.9	Adjoining property info: MCPI; zoning; use; departing property lines					9
FSM 8.101.A.10	Zoning district, overlay and jurisdictional boundaries					10
FSM 8.101.A.11	Yard and setback lines shown on plan or in table.					11
FSM 8.101.A.12	Stakeout note; name, address & phone of party to respond					12
FSM 8.101.A.13	Approval block					13
FSM 8.101.A.16	MCPI (PIN) ref.					14
FSM 8.101.A.17	Topo: NAVD 88 (NGVD 29 OK on proj's. started prior to 11/09/09); date taken; by what means; shows entire site area + 50' overlap					15
FSM 8.101.A.18	P.E. or L.S. seal, signature and date on each sheet.					16
FSM 8.101.A.19	Surveyor's Certificate-source of title, place of record and endorsed by PE or LS					17
FSM 8.106.A	Sheet size 24" x 36" with match lines as nec.					18
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FSM 106.A.1.a	• Title "Construction Plans and Profiles"					20
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FSM 106.A.1.c	• Name and address of the Applicants					22
FSM 106.A.1.d	• Name of the engineer or surveyor who prepared the plan					23

Code Reference	Description	Sheet	AD	RR	N/A	Line
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Code Reference	Description	Sheet	AD	RR	N/A	Line
	vertical curves					
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Code Reference	Description	Sheet	AD	RR	N/A	Line
	travelways, tapers, turn lanes, directional markings (e.g., turn and through arrows, solid and dashed line delineators, etc.), and pedestrian crosswalks shall be provided. VDOT may require a separate application					
FSM 106.A.20	Utility Plan and Profile Standards: The profile of the utilities is required for storm drainage (storm systems & culverts), sanitary sewer, and water distribution systems. Utility profiles are to be drawn to a scale of 1" ≤ 50' H and 1" ≤ 5' V					70
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	○ For residential lots < one acre, spot elevations for the proposed basement floor, first floor, garage slab, and finished grade at the building corners					
	○ For residential lots one acre or greater in size:					
	▪ House, driveway, drainfield, & well location, LOCG, and proposed grading for each lot (if Mtnside &/or Limestone Overlay districts or in steep slopes, then **must** do this option)					
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Code Reference	Description	Sheet	AD	RR	N/A	Line
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Code Reference	Description	Sheet	AD	RR	N/A	Line
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Code Reference	Description	Sheet	AD	RR	N/A	Line
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Code Reference	Description	Sheet	AD	RR	N/A	Line
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FSM 5.230.A.1.a	Concentrated runoff running leaving dev. is discharged directly into well defined nat. or constructed receiving channel, pipe or pipestem. Receiving channel cross sections provided					229
FSM 5.230.b	Conveyance system protection and flood protection analyses provided at every discharge point of concentrated flow originating from site improvements					230
FSM 5.230.c	Increased volumes of sheet flow originating from site improvements that may cause erosion of flooding on down-gradient property shall be identified and diverted to a stable outlet or SWM facility that provides the required conveyance system protection and flood protection					231
FSM 230.A.2.C.a	**For manmade open channels:**					232
FSM 230.A.2.C.1	Provide at a minimum, for first 150', field surveyed corss-sections every 50' and wherever there is a reasonably substantial change in stream geometry, roughness coefficient, or slope					233
FSM 230.A.2.C.2	After first 150', to downstream limit of analysis, provide narrative based on visual inspection					234
FSM 230.A.2.C.b	Pipe stems and pipes: for pipe systems (i.e., storm sewer), segments shall be analyzed and if potential exists for surcharge of system, a hydraulic grade line (HGL) shall be provided					235
FSM 230.A.2.C.b	For individual pipes (e.g., culverts), a controlling headwater must be determined from energy grade line (per VDOT LD-269) or through a stormwater routing calculation					236
FSM 230.B.2	Provide all VRRM spreadsheets					237
FSM 230.B.4.b.v.a	Super silt fence will be substituted for silt fence in all perimeter					238

Code Reference	Description	Sheet	AD	RR	N/A	Line
	locations					
FSM 230.B.4.b.v.b	Sediment traps and basins will provide double the minimum required volume (286 CY/acre), except volume may be reduced to avoid impacts to sensitive environmental features (e.g., streams, wetlands, forest cover, steep slopes)					239
FSM 230.C.1	Identify whether the site is a hotspot; if so, identify measures that reduce pollutants					240
FSM 230.C.4.a	Oil/water separation required facilities that engage in activities (other than agricultural) that potentially generate oily runoff, including, but not limited to, vehicle maintenance/washing/ detailing, fuel storage/dispensing, and machine and paint shops					241
FSM 230.C.4.b	Secondary containment required for activities that propose storing, handling, and/or dispensing of petroleum products (except for liquefied petroleum gas) and hazardous substances					242
FSM 230.C.5.a	Discharge from chemically treated pools, fountains and similar water features – prior to discharge to storm sewer or other manmade or natural stormwater conveyance systems, chemically treated water from pool draining and filtering operations shall be de-chlorinated and metallic-based algaeades shall be removed or neutralized and solids shall be removed and stabilized					243
FSM 5.230.A.1.d	Offsite SWM facilities OK if designed to accommodate site w/ approved maint. agreement					244
FSM 5.230.A.4	SWM is located w/in an easements & esmt. Is 10’ from toe of slope and/or periphery					245
FSM 5.225.B.2	SWM design narrative provided					246
FSM 5.225.B.3	Computations submitted with detail design for proposed SWM facility					247
FSM 5.225.B.3.a	Stage – storage relationship provided					248
FSM 5.225.B.3.b	Stage – discharge relationship provided					249
FSM 5.225.B.3.c	Routing data provided					250
FSM 5.225.B.3.d	Hydrologic computations provided					251
FSM 5.225.B.4	Min. low flow orifice = 2.5” w/ open grill trash protection. May be reduced to 1.75” w/ stack filtering system					252
FSM 5.225.B.5	All dry SWM facilities incorporate provisions for low flow conveyance without concrete trickle ditches					253
FSM 5.225.B.6.a	Underground SWM facility requires Geotech Report					254
FSM 5.225.B.6.c	Underground SWM facility –Description, specs., and maint. schedule provided					255
FSM 5.225.B.7	SWM facilities w/ Infiltration – verify SHWT, incl. perched cond. Is at least 2’ below bottom of fac. – verified by 1 of 3 methods in FSM					256
FSM 5.225.B.7.iv	If 2’ separation bet. facility bottom and SHWT is not achieved, underdrains and clay or geotextile liner is acceptable					257
FSM 5.225.B.4.c	Geotech report required for SWM embankments					258
FSM 5.225.B.5.b	No landscape plantings proposed on dam embankments					259
FSM 5.225.B.5.c	Pond outfalls are far enough from property line to achieve adequate transition per VSMH & VESCH					260
FSM 5.225.B.5.d	Low-level drains provided in wet ponds where gravity outfall is available					261
FSM CH. 4.00	**TRANSPORTATION**					262
FSM 4.200.A.l	Private roadway classification provided					263

Code Reference	Description	Sheet	AD	RR	N/A	Line
FSM 4.200.A.2.b	Dedicate one-half total right of way adjacent to public road					264
FSM 4.200.A.2.e	Curb and gutter req'd. in developments w/in Rte. 28 tax district & PD (excl. PD-RV & PD-CV), & R & CLI.					265
FSM 4.200.A.2.e	Shared use trails provided w/ ditch rd. sections. S/W's permitted 110 trails where lot size ≤ 1.0 acre.					266
FSM 4.200.A.2.f	Reserve (spite) strips controlling access to public roads is prohibited					267
FSM 4.200.A.2.g	In PDH districts, no more than 80 d.u. permitted to be served by a single point of access directly to publicly maintained roadways or indirectly to publicly maintained roadways via access easements.					268
FSM 4.200.A.2.h	Where req'd. by 2.0 interparcel conn. req'd. for vehicular & non-motorized users					269
FSM 4.310.A	Roads configured to avoid floodplain and to limit stream crossings					270
FSM 4.310.B	No roadway shall intersect a public rdwy. or CAT A rd. at < 80°					271
FSM 4.310.C	Road jogs w/ centerline offsets < 225 feet prohibited					272
FSM 4.310.D	Public roads and category A road intersections align with existing or planned roadway intersections					273
FSM 3.310.E	Maximum cul-de-sac lengths conform to table, Ch. 4					274
FSM 4.310.E.1	Cul-de-sac turnaround grades 6% along the FC or EP					275
FSM 4.310.E.2	Cul-de-sac: 40' min. radius at property line; 30' min. radius at face of curb or edge of pavement					276
FSM 4.310.E.3	Developments with a single point of access shall provide a secondary point of access for emergency vehicle use if the length of road exceeds the maximum allowed					277
FSM 4.310.F	Max. landing grade = shall be 3%. Min. length = 50', Breakovers = 6% max. Landings for category B roadways, 6% max. for 25'					278
FSM 4.310.G	Private roads shall have = 50' min. between curb return and/or curb cuts except residential driveways					279
FSM 4.310.H	Curb and gutter sections 6' min. (except Cat. B & C roads) between face of curb and right of way line (or esmt.)					280
FSM 4.310.K	Residential driveway entrances in C&G sections shown in accordance w/ Figures 6 & 7 of Chapter 4					281
FSM 4.310.L	On roads > 2000 VPD, no direct access from D/W or pipestem serving ≤ 3 D.U. w/o traffic calming measures					282
FSM 4.310.L	On roads > 4000 VPD, no direct access from D/W or pipestem serving ≤ 3 D.U.					283
FSM 4.320.A	PUBLIC ROADWAY STANDARDS: All construction shall conform to VDOT standards. Provide note.					284
FSM 4.330.A.3	PRIVATE ROADWAY STANDARDS: Private roadways designed for SU-30 and emergency vehicles. (travelway inside radius ≥ 25", except for alleys)					285
FSM 4.330.A.6	Sidewalks placed within public access easements					286
FSM 4.330.A.6	HC ramps provided at C&G intersections					287
FSM 4.330.B	**CATEGORY A ROADWAYS**					288
FSM 4.330.B.2	Width of access easement for private roads shall extend to property line along frontage of individual lots to which it provides access					289
FSM 4.330.B.3	Category A roads shall have a paved surface. See Table 1 for minimum pavement sections and design criteria					290
FSM 4.330.B.4	Utility easements shall be provided, as necessary					291
FSM 4.330.B.5	Category A roadway requires construction plans & profiles					292

Code Reference	Description	Sheet	AD	RR	N/A	Line
5.1	CAT A rds have a min. 20' travelway width FC to FC					293
FSM 4.330.B.5.2	Turn lanes req'd. at entrances with ADT > 5500 VPD					294
FSM 4.330.B.5.3	Roadways > 3000 VPD shall be super-elevated					295
FSM 4.330.5.4	If ADT > 250 VPD, required pavement thickness shall be based on ADT volumes					296
FSM 4.330.5.5	If ADT ≤ 250 VPD, minimum pavement section: 2" bit. surface course and 6" aggregate base course					297
FSM 4.330.C	**CATEGORY B ROADWAYS**					298
FSM 4.330.C	Category B roads: townhouse and multi-family uses					299
FSM 4.330.C	Design of category B roadways meets minimum standards shown in Table II. Category B: < 1000 VPD					300
FSM 4.330.C	Angle parking is not allowed on type B3 roadways. Parallel parking allowed on Cat. B with additional pavement					301
FSM 4.330.C.1	Roadways and parking areas have a curb section and are contained within an access easement					302
FSM 4.330.C.2	For Type B2 and B3 roads, intersections spaced ≥ 50 feet apart					303
FSM 4.330.C.4	Category B road intersections onto a public or Category A road not spaced < 100 feet at centerline					304
FSM 4.330.C.5	No parking for minimum distance of 30' from intersections measured from the flow line of the gutter pan.					305
FSM 4.330.C.6	Category B roads: Max posted speed = 15 mph					306
FSM 4.330.C.9	Minimum pavement section for Category B roads and parking areas with projected ADT < 250 VPD: 2" bit. surf. & 6" aggr. base					307
FSM 4.330.C.10	Permanent turn-a-round required when dead-end road > 500'					308
FSM 4.330.D	**CATEGORY C ROADWAYS**					309
FSM 4.330.D.1	Category C rds: priv. access rds., cl. III rds. serving ≤ 25 lots, pipestem drives & alleys					310
FSM 4.330.D.2	Category C roads designed to meet Table III min. standards					311
FSM 4.330.D.3.a	Permanent dead-end C3 and C4 roads which exceed 400 feet shall include vehicular turn-a-rounds					312
FSM 4.330.D.3.b	C3 and C4 roads located within class III and IV soils shall provide a field determination of CBR values					313
FSM 4.330.D.3.c	C3 roads constructed of gravel include a 50 foot paved apron when accessing an existing paved road					314
FSM 4.330.D.3.d	C3 and C4 roads include signage for road names, private road identification, and traffic control as appropriate					315
FSM 4.330.D.3.e	The following criteria applies to the design of C1 and C2 roads constructed as pipestem drives:					316
	• Lots sharing a pipestem driveway provide ≥ 3 parking spaces per dwelling outside of the travelway. Driveways clearly labeled or noted "no parking along driveway."					317
	• The design of the pipestems serving more than one lot shown in typical section and on grading plan together with turnaround and required utilities					318
	• Each pipestem clearly identified as a private drive (sign at entry w/ words "Private Drive" & addresses)					319
	• No pipestem extends a distance of > 400 feet from public road to property which it serves or > 800' total if a loop					320
FSM 4.340	**PAVEMENT THICKNESS DESIGN STANDARDS**					321
FSM 4.340.A	Methods and materials shall conform to VDOT standards. Provide					322

Code Reference	Description	Sheet	AD	RR	N/A	Line
	note.					
FSM 4.340.C	Preliminary subbase and pavement design shall be based on an assumed design CBR value of 4. Provide note.					323
FSM 4.340.F	The minimum pavement section for privately owned and maintained parking lots with a projected ADT of less than 400 VPD shall consist of 1.5" bituminous surface course, 3" bit. base course and 6" aggregate subbase course					324
FSM 4.340.G	Pavements in commercial areas shall be of a heavy-duty design in major cartways and loading areas and at dumpster pads. A minimum 6" depth 3000 psi concrete section with steel reinforcement over 4" of aggregate shall be used for loading areas and dumpster pad areas.					325
FSM 4.400	**PARKING GEOMETRIC STANDARDS**					326
FSM 4.400.A.2	Paved parking areas are required for four or more parking spaces and all parking spaces shall be delineated and striped					327
FSM 4.400.B.1	Minimum parking space sizes:					328
	• Standard head-in 9'x 18'					329
	• Parallel parking 8' x 22'					330
FSM 4.400.B.2	Aisle widths for standard car parking lots:					331
	• 90 - 22'					332
	• 60 - 20'					333
	• 45 - 18'					334
	• A minimum aisle width of 25' shall be maintained adjacent to buildings. Min. travel aisle width = 18'					335
FSM 4.400.B.4	Where wheel stops or curbing are provided for parking spaces, a 1 foot reduction in the stall length will be allowed					336
FSM 4.400.B.5	Parking spaces for handicapped persons and related access aisles, accessibility routes and signage for physically handicapped persons shall be provided					337
FSM 4.400.B.6.a	Entrances to parking bays shall be located along the site access way to avoid blockage of the public right-of-way. No parking shall be allowed within 30 feet of the entrance					338
FSM 4.400.B.6.b	Major site accessways shall be clearly defined, with a minimum aisle width of 25 feet. No direct angle parking shall be allowed where ADT's exceed 1500 VFD					339
FSM 4.400.B.6.c	Retaining walls, screens, landscaping and building walls shall be protected from vehicle contact					340
FSM 4.400.B.6.d	Overhang areas which are a part of the required parking space graded $\leq$ 2" above top of curb not encroached by landscape plantings, signs, or obstructions.					341
FSM 4.400.B.6.e	Loading spaces and dumpster pads shall be accessible by the design vehicle with all parking spaces occupied					342
FSM 4.400.B.6.f	For drive-through facilities are proposed, the travelway width shall be a minimum of 10 feet and shall provide safe vehicle stacking					343
FSM 4.400.B.8	A Permanent turn-a-round shall be required when the dead-end aisle exceeds 500 feet					344
FSM 4.400.C	**LOADING SPACES**					345
FSM 4.400.C.1.a	Single unit loading space: 15' x 30'; 15' minimum horizon. clearance. When more than one space is provided adjacent to each other, additional spaces: 12 feet wide.					346
C.1.b	Uses which are req'd. to provide a single unit ldg. sp. shall provide					347

Code Reference	Description	Sheet	AD	RR	N/A	Line
	an entr. & circulation system which can accom. a SU-30 des. veh.					
FSM 4.400.C.2.a	Semi-trailer loading sp: 15' x 55'; 15' min. horiz. clearance					348
FSM 4.400.C.2.b	Uses which are req'd. to provide a single unit ldg. sp. shall provide an entr. & on-site circulation system which can accom. a WB-50 des. veh.					349
FSM 4.400.C.4	No off-roadway loading area shall be located within any front yard. Loading areas shall be designed and located such that they do not interfere with the free circulation of vehicles within parking and stacking areas					350
FSM 4.500	**DRIVEWAYS**					351
FSM 4.500.B.1	Driveway slopes shall be 12% or less					352
FSM 4.500.B.2	Driveways in Mtnside Dev. Overlay district or in steep slope areas – 16% max.					353
FSM 4.500.B.3	Driveways maintain full width of garage doors to property line or a distance of 18 feet outside of garage, whichever is less.					354
FSM 4.500.B.4	Skewed driveways cannot exceed a 10:1 angle with the driveway apron or garage – provide Fig. 8 or 9					355
FSM 4.500.B.5	Curved driveways must be designed with a 10 foot minimum inside radius and a 24 foot outside radius – provide Fig. 10 or 11					356
FSM 4.500.B.6	Tapered driveways cannot exceed 10:1 taper - prov. Fig. 8, 9 or 10					357
FSM 4.500.B.8	Roll top curbs not allowed as D/W entrances					358
FSM 4.600	**PEDESTRIAN AND BICYCLEACCOMMODATIONS**					359
FSM 4.600.A.3.a	NCUS provides access to destinations such as recreation, school, retail & commercial locations within subdivision					360
FSM 4.600.A.3.b	NUCS req'd. to extend to property boundaries of project, tie into ex. systems & previously approved planned systems and provide for future additions. When a sidewalk or trail is located outside of VDOT right-of-way, rt. shall be contained within a public access easement 1' beyond outside both sides of s/w or trail.					361
FSM 4.600.A.3.c	Sidewalks shall be provided on both sides of curb and gutter roadways for single family detached lots					362
FSM 4.600.A.3.d	Sidewalks shall be provided in front of all units and to the parking areas for townhouses and multi-family units					363
FSM 4.600.A.3.e	Sidewalks or trails shall be provided leading to activity centers and/or crosswalks such as play grounds, pools, tot lots and rec. centers					364
FSM 4.600.A.3.f	Office and commercial areas: Sidewalks leading to facility and/or crosswalks					365
FSM 4.600.A.3.g	NUCS provided along road frontages to provide pedestrian interparcel access where such access is set forth in the Zoning Ordinance as a performance standard					366
FSM 4.600.A.3.h	Sidewalks provided on both sides of roadway where they conform to VDOT standards and allowances					367
FSM 4.600.A.3.i	Shared-use trails provided w/ shoulder and ditch rds. in Suburban Policy Areas, transition Policy Areas, Joint Land Mgmt. Areas & Rural Villages. S/Ws may be provided in lieu of shared-use trails in devs. of lots of 1acre or less.					368
FSM 4.600.B	**SIDEWALKS**					369
FSM 4.600.B.1.a	Sidewalk and trails shall be constructed on a subgrade compacted to 95% density at opt. moist. content					370
FSM 4.600.B.1.b	Sidewalk and trails shall be constructed to one of the following					371

Code Reference	Description	Sheet	AD	RR	N/A	Line
	cross-sections:					
	• VDOT Type A-3 concrete, 4" thick					372
	• 4" thick crushed stone (21-A) topped with 1.5" asphalt					373
	• On well-drained soil, 4" of asphalt					374
	• Alternative sections may be approved by the Director and VDOT					375
FSM 4.600.B.1.c	The maximum s/w cross-slope allowed shall be 1/4" per foot					376
FSM 4.600.B.1.d	Sidewalks shall be constructed to VDOT standards-provide note					377
FSM 4.600.B.1.e	Sidewalk longitudinal slope shall be consistent with the adj. rdwy.					378
FSM 4.600.B.1.f	VDOT standards for CG-12 shall be provided at pedestrian roadway crossings on curb and gutter roadway sections (includes trails)					379
FSM 4.600.B.1.g	Sidewalks shall have a minimum unobstructive width of 5 feet for residential developments where the average density exceeds 10 units per acre, for non-resid. dev. & for dev. adj. to rds in CTP. For all other applications a min. width of 4'					380
FSM 4.600.B.2	**SHARED-USE TRAILS**					381
FSM 4.600.B.2.d	Shared-use trails outside of VDOT R.O.W.: Min. width 6'					382
FSM 4.800	**SIGNS**					383
FSM 4.800.1	Where Fire Lane identification is required:					384
	• Travelways w/ total width < 26' shall be identified as Fire Lane on both sides of travelway					385
	• Travelways w/ total width ≥ 26', and ≤ 32' shall be identified as Fire Lane on one side of travelway					386
	• Commercial/non-residential bldgs. shall require Fire Lane identification along frontage of bldg. and at other bldg. access points					387
	• Public pools shall provide Fire Lane identification at any entrance for emergency vehicles					388
FSM 4.800.2	Fire Lane identification specifications for Residential Developments:					389
	a) Fire Lane signs shall be installed at beginning and end of designated Fire Lane w/ directional arrows pointing in. Curbing shall be painted yellow w/ "Fire Lane" stenciled in black on curbing every 50' of Fire Lane in 4" letters					390
	b) In lieu of curb markings, Fire Lanes ≥ 75' in length may have intermediate "Fire Lane" signs installed w/ double directional arrows pointing away from center of sign towards opposing ends of fire lane; spacing of signs is ≤ 80' in residential areas					391
FSM 4.821	Sign installed indicating possible extension of street where a future street extension is anticipated to provide access to adjacent property					392
FSM 4.830	Handicap signs provided in accordance with ADA reqs.					393