

IVINS CITY - MINIMUM FIELD TESTING CHECKLIST

Project Name:

Contractor:

MINIMUM FIELD TESTING		Asterisk (*) indicates that Ivins City has modified the lot size or other information from the APWA standard specification.						Use Testing Firm	Test Date	Passed?	Retest Date
		APWA Spec	Lot	Sublot	Samples /sublot	Ref Test	Standard				
EARTHWORK											
Roadway Proof Rolling Prior to Fill	32 05 10		1/2 veh width				18,000 pounds/tandem axle, verify no deflections	Ivins City Compaction Standards (APWA Section 31 23 26 as modified): Under Landscaped Areas: 90% Under Roadways: 95% Under Footings: 95% Under Sidewalks/Trails: 95% Exception for fine grained soils compaction requirements are 91%. Per 31 23 26, use modified proctor for A-1 soils, otherwise use standard proctor. Compact in lifts 6" thick compacted for Roadbase and 8" thick uncompactd for all other fills.			
Roadway Proof Rolling Subgrade	32 05 10		1/2 veh width				18,000 pounds/tandem axle, verify no deflections				
Roadway Subgrade Field Moisture/Density	32 05 10		9000 sf	-	1	ASTM D698	Meet Compaction Standards		x		
Pavement Area Fill Field Moisture/Density	32 05 10*		300 cy	-	1	ASTM D698	Meet Compaction Standards		x		
Driveway Area Fill Field Moisture/Density	32 05 10*		300 cy	-	1	ASTM D698	Meet Compaction Standards		x		
Sidewalk Area Fill Field Moisture/Density	32 05 10*		300 cy	-	1	ASTM D698	Meet Compaction Standards		x		
Embankment Fill Field Moisture/Density	31 23 23*		300 cy	-	1	ASTM D698	Meet Compaction Standards		x		
Strip Footing Subgrade Field Moisture/Density	31 23 23		200 lf	-	1	ASTM D698	Meet Compaction Standards		x		
Footing (not strip) Subgrade Field Moisture/Density	31 23 23		225 sf	-	1	ASTM D698	Meet Compaction Standards		x		
Trench Subgrade Field Moisture/Density	33 05 20*		Test not required by Ivins City						x		
Trench Fill Field Moisture/Density	33 05 20*		200 lf / 2 lifts	-	1	ASTM D698	Meet Compaction Standards		x		
Trench Fill Field Moisture/Density beneath footing	33 05 20		25 sf / lift	-	1	ASTM D698	Meet Compaction Standards		x		
Misc. Small Structures Subgrade Field Moisture/Density	31 23 23*		Test not required by Ivins City						x		
Misc. Small Structures Backfill Field Moisture/Density	31 23 23*		Every 2 lifts	-	1	ASTM D698	Meet Compaction Standards		x		
FLOWABLE FILL											
Flowable Fill Trench - Compressive	31 05 15		1 d	100 cy	3cyl	ASTM D4832	28 d strength is 60 psi or less		x		
Flowable Fill Roadway - Compressive	31 05 15		1 d	250 cy	3cyl	ASTM D4832	28 d strength is 60 psi or less	x			
PULVERIZED PAVEMENT											
Gradation (Lab)	02 41 15*		9000 sf	-	1	ASTM C136	Verify with engineer that meets requirements of design.	x			
Depth	02 41 15*		9000 sf	-	1		Average thickness >= design thickness, no single location deviation of more than 1-inch				
Field Moisture/Density Testing	02 41 15*		9000 sf	-	1	ASTM D558/ASTM D2922	Meet Compaction Standards	x			
California Bearing Ratio or R-Value (Lab)			9000 sf	-	1	ASTM D1883/ASTM D2844	Verify with engineer that meets requirements of design.				
ROADBASE											
Field Sample Gradation (Lab)	32 11 23		500 cy	-	1	ASTM C136	See 32 11 23 Table 3 (2007 Supplement)	x			
Field Moisture/Density Tests - Pavement Area	32 05 10*		-	9000sf/ 2 lifts	1	ASTM D2922	Meet Compaction Standards	x			
Field Moisture/Density Tests - Curb & Gutter, Waterways	32 05 10*		-	200lf/ 2 lifts	1	ASTM D2922	Meet Compaction Standards	x			
Field Moisture/Density Tests - Sidewalk	32 05 10*		-	400lf/ 2 lifts	1	ASTM D2922	Meet Compaction Standards	x			
Field Moisture/Density Tests - Driveway Approach	32 05 10*		-	800sf/ 2 lifts	1	ASTM D2922	Meet Compaction Standards	x			
Grade, Cross-slope	32 11 23*		1000 sf	-	2 minimum		3/8" per 10 ft in any direction				
Field Moisture/Density - Trench	33 05 20*		200 lf/ 2 lifts	-	1	ASTM D2922	Meet Compaction Standards	x			
Field Moisture/Density - Trench under footing	33 05 20		25 sf/lift	-	1	ASTM D2922	Meet Compaction Standards	x			
Thickness	32 11 23*		9000 sf	-	2 minimum		Average thickness >= design thickness, no single location deviation of more than 1-inch				
Strip Footing Field Moisture/Density Test	31 23 23		200lf/lift	-	1	ASTM D2922	Meet Compaction Standards	x			
Footing (not strip) Field Moisture/Density Test	31 23 23		225sf/lift	-	1	ASTM D2922	Meet Compaction Standards	x			
Misc. Small Structures Field Moisture/Density Test	31 23 23		each lift	-	1	ASTM D2922	Meet Compaction Standards	x			
ASPHALT											
Air Voids (Lab)	32 12 05		1 day	500 tons	1	ASTM D5581	3 - 5 percent (32 12 05 Table 3)	x			
Dust to Asphalt Ratio (Lab)	32 12 05		1 day	500 tons	1	ASTM D6307	See 32 12 05 Table 1	x			
Gradation by extraction (Lab)	32 12 05		1 day	500 tons	1	ASTM D5444	See 32 12 05 Table 1	x			
Asphalt Content (Lab)	32 12 05		1 day	500 tons	1	ASTM D5581	3 - 5 percent (32 12 05 Table 3)	x			
Asphalt Field Temperature	32 12 16		Each Transport Vehicle		1		325 deg F Maximum	x			
Asphalt Surface Temperature	32 12 16*		-	-	Continuous		325 def F. Maximum, See Table 3 for Minimum Temperature 10ft behind paver				
Core Rice Density (Lab)	32 12 16*		9000 sf	-	2 cores min	ASTM D2041	Avg 92 to 96% Density, Lowest 89% or greater (See 32 12 16 Table 1 in supplement)	x			
Core Thickness	32 12 16*		9000 sf	-	2 cores min	ASTM D3549	3/8" deficiency limit avg	x			
Grade	32 12 16		-	-	-		Verify within tolerance. 1/8" in 10 ft parallel to centerline				
Cross-Slope	32 12 16		-	-	-		Verify within tolerance. 1/4" in 10 ft perpendicular to centerline				
Roughness	32 12 16*		0.1 Lane mi	-	Continuous	ASTM E950 & ASTM E1274	Verify (See 32 12 16 Table 4) - Only required on Arterial Streets	?			
CONCRETE											
Mix design verification	03 30 04		Per Type/Source				Matches approved mix design				
Compressive Strength	03 30 05		50cy or 1d	-	4cyl/lot	ASTM C39	See 03 30 04 Table 3 - 1 break at 7days, 3 breaks at 28days, avg must meet strength	x			
Temperature	03 30 05		50cy or 1d	-	1	ASTM C1064	60 deg F to 90 deg F (03 30 10 p. 208)				
Air Entrainment	03 30 05		50cy or 1d	-	1	ASTM C231	See 03 30 04 Table 3	x			
Slump Tests	03 30 05		50cy or 1d	-	1	ASTM C143	Specific to exposure conditions and finishing need	x			
Line	32 16 13		All curbs and gutters				Less than 1/2" in 10 ft				
Grade & Flood gutters	32 16 13		All				No more than 1/4" in 10 ft, Remove & replace where ponding is found				
Curb Ramps	32 16 14		All				No standing water, no trip, slopes				

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		APWA Spec	Lot	Sublot	Samples /sublot	Ref Test	Standard				
DRAINAGE SYSTEMS											
	Materials verification prior to installation		All materials				Matches approved materials, free from visual defects				
	Alignment and Grade	33 08 00	All pipe				1/2" in 10 ft, 1" max variance from true line, when grade is 1% or less, variances must be 50% less				
	Obstruction and Deflection Test (Mandrel)	33 08 00	All pipe				3 to 7.5 % depending on pipe type, 1-inch max protuberance				
	Infiltration Test	33 08 00	All pipe				max 50 gal per inch dia per mile per 24 hrs				
	Pressure Testing - for force mains	33 08 00	All pipe				225 psi for 2 hrs, check allowable leakage				
	Video Inspection	33 08 00	All pipe				Free from visual defects, submit video electronic files and video log	x			
	Air Test	33 08 00	All pipe			UNI-B-6, ASTM F1417, ASTM C924	Per manufacturer's recommendations				
	Cleaning	33 41 00	All pipe				remove all debris after testing				
SEWER LINES											
	Materials verification prior to installation		All materials				Matches approved materials, free from visual defects				
	Alignment and Grade	33 08 00	All mains and laterals				1/2" in 10 ft, 1" max variance from true line, when grade is 1% or less, variances must be 50% less				
	Obstruction and Deflection Test (Mandrel)	33 08 00	All mains				3 to 7.5 % depending on pipe type, 1-inch max protuberance				
	Infiltration Test	33 08 00	All mains and laterals				max 50 gal per inch dia per mile per 24 hrs				
	Pressure Testing - for force mains	33 08 00	All mains				225 psi for 2 hrs, check allowable leakage				
	Video Inspection	33 08 00	All mains				Free from visual defects, submit video electronic files and video log	x			
	Air Test	33 08 00	All mains and laterals			UNI-B-6, ASTM F1417, ASTM C924	Per manufacturer's recommendations				
	Cleaning	33 31 00	All mains and laterals				remove all debris after testing				
CULINARY WATER											
	Materials verification prior to installation		All materials				Matches approved materials, free from visual defects				
	Pressure Testing	33 08 00	All pipe				225 psi for 2 hrs, check allowable leakage				
	Obstruction and Deflection Test (Mandrel)	33 08 00	All pipe				3 to 7.5 % depending on pipe type, 1-inch max protuberance				
	Disinfection, Flushing & Bacteria Testing	33 13 00	All pipe				Negative Bacteria sample				
	Operational Inspection		All pipe				All equipment is operating as designed				
	Tracer Wire Continuity Test	33 08 00*	All wire				All wire provides a continuous signal				
SECONDARY WATER											
	Materials verification prior to installation		All materials				Matches approved materials, free from visual defects				
	Alignment and Grade	33 08 00	All pipe				1/2" in 10 ft, 1" max variance from true line, when grade is 1% or less, variances must be 50% less				
	Pressure Testing	33 08 00	All pipe				225 psi for 2 hrs, check allowable leakage				
	Flushing	33 13 00	All pipe				2.5 fps flush				
	Operational Inspection		All pipe				For Irrigation Equipment				
	Tracer Wire Continuity Test	33 08 00*	All wire				All wire provides a continuous signal				
ROADWAY LIGHTING											
	Materials verification prior to installation		All materials				Matches approved materials, free from visual defects				
	Continuity	26 56 19	Circuit	-	1		Pass/Fail				
	Grounding	26 56 19	Circuit	-	1		Pass/Fail				
	Megger Test at 500 V DC	26 56 19	Circuit	-	1		Insulation Resistance to Ground not less than 10 megohms				
	Voltage	26 56 19	Circuit	-	1		Record voltage measured				
	Current	26 56 19	Circuit	-	1		Record current measured				
	Functional Test	26 56 19	Function		5days		Continuous satisfactory operation				

List of APWA Required Submittals				
Submittal Description	Section	Timing	Notes	
Initial Submittals				
Contractor Information & Qualifications				
Subcontractor Information & Qualifications	01 43 00			
Testing Firm Information & Qualifications	01 45 00			Shouldn't be required if City does all testing.
Schedule	01 32 16			
SWPPP				
NOI				
Construction Permit				
Product Option List & Substitutions	01 25 00			
Traffic Control Plans	01 55 26			
Preliminary Draft or Outline of O&M Manuals	01 78 23			Only required for specialized equipment like pumps
Pre-construction photographs	01 78 39			when within 100 feet of improved private property
During Construction				
Monthly Schedule Updates	01 32 16			
DIVISION 02 EXISTING CONDITIONS				
Pavement Pulverizing submittals	02 41 15			
DIVISION 03 CONCRETE				
Concrete Forming Shop Drawings & Submittals	03 11 00			Not for typical PW project
Concrete Reinforcing: Material Certification	03 20 00			
Concrete Reinforcing: Welder's Certification	03 20 00			Not for typical PW project
Concrete Reinforcing: Shop Drawings	03 20 00			Not for typical PW project
Concrete: Mix Design	03 30 04			
Concrete Testing: Supplier QC	03 30 05	Upon Request		
Concrete Testing: Lab results	03 30 05	After Install		Shouldn't be required if City does all testing.
Concrete Placement: Batch Delivery Tickets	03 30 10	Upon Delivery		
Concrete Placement: Records	03 30 10	After Install		
Concrete Placement: Bonding Compound	03 30 10			
Concrete Finishing: Liquid Chemical Hardener	03 35 00			Not for typical PW project
Concrete Curing: Curing Agent Cert. & Plan	03 39 00			
Precast Concrete: Shop Drawings	03 40 00			
Cementitious Grouting: Grout Mix & Cert.	03 61 00			
DIVISION 04 MASONRY				
Masonry Mortar & Grout: Grout Mix & Cert.	04 05 16			Not for typical PW project
Clay Unit Masonry: Samples & Cert.	04 21 00			Not for typical PW project
Concrete Unit Masonry: Samples, Certs, Shop Dwgs	04 22 00			Not for typical PW project
DIVISION 05 METALS				
Structural Steel Framing: Certs.	05 12 00			Not for typical PW project
Metal Stairs: Shop Drawings & Samples	05 51 00			Not for typical PW project
Gratings & Floor Plates: Shop Drawings	05 53 00			
Metal Castings: Shop Dwgs and Certs	05 56 00			
DIVISION 06 WOOD, PLASTICS AND COMPOSITES				
Rough Carpentry: Certs.	06 61 00			Not for typical PW project
DIVISION 07 THERMAL AND MOISTURE PROTECTION				
Water Repellant: Data sheets & install instr.	07 19 00			Not for typical PW project
Insulation: Data sheets & install instr.	07 21 00			Not for typical PW project
DIVISION 09 FINISHES				
Painting: Color Selection Chart & Data sheets	09 91 00			Not for typical PW project
Painting: Samples	09 91 00			Not for typical PW project
Graffiti Resistant Coating: Perf. Data & Install Instr.	09 96 23			Not for typical PW project
Coatings for Steel Water Storage Tank: Product Data	09 97 15			Not for typical PW project
DIVISION 13 SPECIAL CONSTRUCTION				
Metal Building: Dwgs and Certs.	13 34 19			Not for typical PW project
DIVISION 22 PLUMBING				
Mechanical General Requirements: dwgs	22 05 00			Not for typical PW project
Water Pump: dwgs, specs	22 11 23			Not for typical PW project
Water Pump: Start Up Cert.	22 11 23	After Install		Not for typical PW project
Water Storage Tank: QA, Certs, designs	22 12 19			Not for typical PW project
Submersible Pump: dwgs, curves	22 13 33			Not for typical PW project
Submersible Pump: Start Up Cert.	22 13 33	After Install		Not for typical PW project
DIVISION 26 ELECTRICAL				
Electrical General Requirements: Wiring Layout	26 05 00			
Electrical General Requirements: Inspection Cert.	26 05 00	After Install		
Conductors and Cables: Field Test Data, no data sheets?	26 05 13			
Panelboard: Data sheets, shop dwgs	26 09 26			Not for typical PW project
Circuit Breaker: Data Sheets, shop dwgs	26 13 13			Not for typical PW project
Motor Controller: Data Sheets, dwgs	26 29 13			Not for typical PW project
Motor Controller: Voltage Current Report	26 29 13	After Install		Not for typical PW project
Roadway Lighting: Data sheets, Shop Dwgs, Testing	26 56 19			
DIVISION 31 EARTHWORK				
Markers & Monuments: Survey Notes & Dwgs, Plat	31 05 10	After Install		
Common Fill: Source & Gradation	31 05 13			
Cement Treated Fill: Material Analysis, design calcs?	31 05 15			
Geotextiles: Cert. & Sample	31 05 19			
Geogrids/composites: Warranties & Samples	31 05 21			
Rock Removal: Pre-blast Photos, Blast Plan	31 23 17			
Backfilling for Structures: Soil Proctor for Subgrades	31 23 23			
Backfilling for Structures: Soil Proctor for each type of fill	31 23 23			
Backfilling for Structures: Quality Control Reprint	31 23 23	Upon Request		Shouldn't be required if City does all testing.
Erosion & Sediment Control: samples, data, certs, install	31 25 00			
Vegetation Control: herbicide data sheet	31 31 19	if used		
Gabions: data sheets, design criteria	31 36 00			Not for typical PW project
Rip Rap or Rock: Gradation Data, wear resist, placement	31 37 00			

Submittal Description	Section	Timing	Notes
Shoring: Protective System Plan	31 41 00	Upon Request	
DIVISION 32 EXTERIOR IMPROVEMENTS			
Signage: support shop dwgs, samples	32 01 05		
Slurry Seal: Mix Design, equip., asphalt	32 01 13		
Slurry Seal: Quality Control Report	32 01 13	Upon Request	Shouldn't be required if City does all testing.
Chip Seal: Mix Design, equip., asphalt	32 01 14		
Chip Seal: Quality Control Report	32 01 14	Upon Request	Shouldn't be required if City does all testing.
Micro-Surface Seal: Mix Design, gradations, certs, testing	32 01 15		
Micro-Surface Seal: Quality Control Report	32 01 15	Upon Request	Shouldn't be required if City does all testing.
Recycled Asphalt Paving: Mix design, equip., asphalt	32 01 16		
Recycled Asphalt Paving: Delivery Tickets	32 01 16	Upon Delivery	
Crack Seal: Data Sheets	32 01 17		
Concrete Paving Raising: Data and Plan	32 01 29		Not for typical PW project
Pruning Trees: Tree protection plan	32 01 93		Not for typical PW project
Pruning Trees: arborist cert.	32 01 93	Upon Request	Not for typical PW project
Backfilling Roadways: Soil Proctors	32 05 10		
Backfilling Roadways: Aggregate Delivery Tickets	32 05 10	Upon Delivery	
Backfilling Roadways: Quality Control Report	32 05 10	Upon Request	Shouldn't be required if City does all testing.
Aggregate Base: Target Gradation, Data, Proctor Data	32 11 23		
Paving Asphalts: Bill of Ladings	32 12 03	After Install	
Asphalt Concrete: Mix Design	32 12 05		
Asphalt Concrete: Quality Control Report	32 12 05	Upon Request	Shouldn't be required if City does all testing.
Superpave: Mix Design	32 12 06		
Superpave: Quality Control Report	32 12 05	Upon Request	Shouldn't be required if City does all testing.
Prime Coat: Asphalt Cert.	32 12 13		
Tack Coat: Asphalt Cert.	32 12 14		
Plant Mix Asphalt Paving: equip, plant info, profilograph cert	32 12 16		
Plant Mix Asphalt Paving: Delivery Tickets	32 12 16	Upon Delivery	
Plant Mix Asphalt Paving: Profile Reports	32 12 16	After Install	
Plant Mix Asphalt Paving: Quality Control Reptot	32 12 16	Upon Request	Shouldn't be required if City does all testing.
Cold Mix Asphalt Paving: Mix Design	32 12 17		Not for typical PW project
Cold Mix Asphalt Paving: Delivery Tickets	32 12 17	Upon Delivery	Not for typical PW project
Concrete Paving: Plans, Certs, Equip, Install Data	32 13 13		Not for typical PW project
Concrete Paving: Delivery Tickets	32 13 13	Upon Delivery	Not for typical PW project
Concrete Paving: Profile Reports	32 13 13		Not for typical PW project
Concrete Paving: Quality Control Reptot	32 13 13	Upon Request	Not for typical PW project
Concrete Paving Joint Sealants: Certs, Data, Install, Safety	32 13 73		Not for typical PW project
Precast Concrete Unit Paving: Data, Equip Cert	32 14 13		Not for typical PW project
Brick Unit Paving: Samples, Test Reports	32 14 16		Not for typical PW project
Driveway, Sidewalk, Curb, Gutter: Quality Control Report	32 16 13	Upon Request	Shouldn't be required if City does all testing.
Curb Ramp: Detectable Warning Data Sheet	32 16 14		
Pavement Markings: Specs, Certs, Samples, Install	32 17 23		
Chain Link Fences and Gates: Dwgs, Data, Samples	32 31 13		Not for typical PW project
Welded Wire Fences and Gates: Dwgs and Data	32 31 16		Not for typical PW project
Crib Walls: Dwgs, Specs, Calcs	32 32 26		Not for typical PW project
Underground Irrigation Systems: Data, Dwgs, O&M Manuals	32 84 23		
Underground Irrigation Systems: Pipeline Testing	32 84 23		
Landscape Grading: Soil Proctors	32 91 19		
Landscape Grading: Quality Control Report	32 91 19	Upon Request	Shouldn't be required if City does all testing.
Turf and Grasses: Sod Source info	32 92 00		
Turf and Grasses: Top Soil Lab Analysis	32 92 00	Upon Request	
Ground Cover: Plant lists, certs., schedule	32 93 13		
Tree: Notice to property owner	32 93 43		????
DIVISION 33 UTILITIES			
Concrete Pipe and Culvert: Cert., precast box design summary	33 05 12		
Pre-stressed Concrete Pipe: Design Summary	33 05 08		
Steel Pipe - Lined and Coated: Design Summary, Dwgs	33 05 09		
Backfilling Trenches: Soil Proctors	33 05 20		
Backfilling Trenches: Quality Control Report	33 05 20	Upon Request	Shouldn't be required if City does all testing.
Trenchless Utility Installation: Jacking Details	33 05 23		
Pavement Restoration: Mix Designs	33 05 25		
Commissioning of Water Utilities: Test Report	33 08 00	After Install	Shouldn't be required if City does all testing.
Water Distribution and Transmission: Product Data	33 11 00		
Water Distribution and Transmission: O&M & Record Docs	33 11 00	After Install	
Water Valves: Product Data	33 12 16		
Hydrants: Product Data & Dwgs	33 12 19		
Water Meter: Product Data	33 12 33		
Disinfection: Contractor cert, lab cert	33 13 00		
Disinfection: Disinfection & Bacteriological Report	33 13 00	After Install	
Ponds: Fill Analysis, Samples	33 47 00		Not for typical PW project
Ponds: QA Test Results	33 47 00	After Install	Not for typical PW project
DIVISION 34 TRANSPORTATION			
Traffic Signals: dwgs, certs, install	33 41 13		Not for typical PW project
Traffic Signals: Testing Results	33 41 13	After Install	Not for typical PW project
Vehicle Delineators: Product Data	34 71 19		
Prior to Closeout			
Construction Layout Survey Documentation	01 71 23		
Survey Referencing Documentation	01 71 34		
Operation and Maintenance Data	01 78 23		
Project Record Documents	01 78 39		

Ivins City Cost Estimation Approved Unit Prices

Category	Item No.	Item Description	Units	City Approved Unit Price
General				
	10	Mobilization		5%
	20	Storm Water Pollution Prevention	AC	\$ 500.00
	30	Dust Control	AC	\$ 200.00
Site Work				
	100	Clear & Grub	AC	\$ 500.00
	110	Onsite Cut and Fill	CY	\$ 2.50
	120	Export	CY	\$ 5.00
	130	Import	CY	\$ 7.00
	140	Masonry Wall - >5' High	LF	\$ 50.00
	150	Masonry Wall - <5' High	LF	\$ 40.00
	160	Masonry Retaining Wall	SF	\$ 12.00
	170	Natural Rock Retaining Wall	SF	\$ 12.00
Streets				
	200	Sidewalk: 4" Concrete over 4" Base	SF	\$ 3.25
	205	Sidewalk: 6" Concrete over 6" Base	SF	\$ 4.50
	210	Trail: 2.5" Asphalt over 4" Base	SF	\$ 4.00
	220	24" Modified Curb & Gutter and Base (See Note 4)	LF	\$ 11.00
	225	30" High Back Curb & Gutter and Base (See Note 4)	LF	\$ 11.00
	230	2.5" Thick Asphalt	SF	\$ 1.25
	235	3" Thick Asphalt	SF	\$ 1.50
	240	4" Thick Asphalt	SF	\$ 2.00
	250	6" Thick Roadbase	SF	\$ 0.72
	255	8" Thick Roadbase	SF	\$ 0.96
	260	Fog Seal over Asphalt	SF	\$ 0.07
	270	Disabled Accessible Curb Ramp (See Note 3)	LS	\$ 600.00
	280	Cross Gutter (See Note 4)	SF	\$ 8.00
	290	Street Signs	EA	\$ 250.00
	300	Pavement Markings	LF	\$ 0.12
Water Systems				
	400	C900 (or C909) PVC - 4" Pipe (incl. fittings)	LF	\$ 15.00
	401	C900 (or C909) PVC - 6" Pipe (incl. fittings)	LF	\$ 17.00
	402	C900 (or C909) PVC - 8" Pipe (incl. fittings)	LF	\$ 20.00
	404	C900 (or C909) PVC - 12" Pipe (incl. fittings)	LF	\$ 30.00
	420	Gate Valve & Valve Box - 4"	LS	\$ 600.00
	421	Gate Valve & Valve Box - 6"	LS	\$ 750.00
	422	Gate Valve & Valve Box - 8"	LS	\$ 1,500.00
	424	Gate Valve & Valve Box - 12"	LS	\$ 2,200.00
	440	8" Hot Tap Assembly	LS	\$ 2,000.00
	450	3/4" Meter Service	LS	\$ 600.00
	460	Fire Hydrant 6" Lateral, Valve & Assembly	LS	\$ 3,750.00
	470	2" Flush Valve Assembly	LS	\$ 500.00
	480	Raise/Collar Valve	EA	\$ 100.00
Sewer Systems				
	600	SDR35 PVC - 8" Main Pipe	LF	\$ 20.00
	620	4" SDR35 PVC Sewer Lateral	LS	\$ 500.00
	630	Concrete Manhole - 48" Diameter < 12 ft depth	LS	\$ 1,800.00
	640	Concrete Manhole - 60" Diameter < 12 ft depth	LS	\$ 2,500.00
	641	Concrete Manhole - 60" Diameter > 12 ft depth	LS	\$ 3,000.00
	650	Raise/Collar Manhole	EA	\$ 300.00
Storm Drain Systems				
	700	Storm Drain Pipe - 12" HDPE or NRCP	LF	\$ 20.00
	710	Storm Drain Pipe - 15" HDPE or NRCP	LF	\$ 25.00
	720	Storm Drain Pipe - 18" NRCP	LF	\$ 30.00
	730	Storm Drain Pipe - 24" NRCP	LF	\$ 40.00
	740	Storm Drain Single Inlet < 6 ft depth	LS	\$ 1,800.00
	741	Storm Drain Inlet (Single) > 6 ft depth	LS	\$ 2,200.00
	750	Storm Drain Double Inlet < 6 ft depth	LS	\$ 3,000.00
	751	Storm Drain Double Inlet > 6 ft depth	LS	\$ 3,750.00
StreetLights				
	800	2" Buried Streetlight Conduit	LF	\$ 8.00
	810	Streetlight Pull Box	LS	\$ 500.00
	820	14' Streetlight	LS	\$ 2,800.00
	830	18' Streetlight	LS	\$ 3,300.00
	840	18' Streetlight - Dual Luminaire	LS	\$ 5,200.00
	850	Bollard Light	LS	\$ 1,350.00
Joint Utilities				
	900	Joint Utility Trench	LF	\$ 10.00
	910	Gas Utility Line	LF	\$ 10.00

- Notes:
- The City Engineer shall modify this document as necessary as evidence of market changes presents.
 - All bond estimates and calculation of construction permit fee shall be based on these unit prices.
 - This curb ramp cost item is an additive cost to sidewalk surface area and curb and gutter that should already be included in Item Nos. 200-240.
 - The cross gutter area is calculated by the concrete area that is not included in the area enclosed by a line projection of the lip of the gutter around the radius of the street corner. (The curb and gutter quantities should include the curb radius areas of the corners.)
 - All estimates shall be prepared and stamped by a Utah professional engineer.
 - This list may not contain all of the items required for a construction site development. The professional engineer preparing the estimate shall use market information to determine prices of other required construction items.

**IVINS CITY
SUBDIVISION IMPROVEMENTS
FINAL INSPECTION CHECKLIST**

Development name: _____

<u>Date</u> <u>Approved</u>	<u>By</u> <u>(initials)</u>	<u>Description</u>	<u>Comments</u>
_____	_____	Sanitary sewer	_____
_____	_____	Storm sewer	_____
_____	_____	Culinary water	_____
_____	_____	Secondary water	_____
_____	_____	Natural gas	_____
_____	_____	Electrical power	_____
_____	_____	Telephone	_____
_____	_____	Cable television	_____
_____	_____	Curb & gutter	_____
_____	_____	Sidewalk	_____
_____	_____	Road subgrade	_____
_____	_____	Road base	_____
_____	_____	Road pavement	_____
_____	_____	Street lights	_____
_____	_____	Parks, trail system	_____
_____	_____	Fire hydrants	_____
_____	_____	Street signs	_____
_____	_____	Monuments	_____
_____	_____	Final grading report & test location map	_____
_____	_____	Final cleanup	_____
_____	_____	"As Built" drawings	_____
_____	_____	Conditional Acceptance of improvements _____	_____
_____	_____	Guarantee satisfied (2 years from date of conditional acceptance)	_____

Notes covering guarantee period:



IVINS CITY

55 N. Main St. Ivins, UT 84738
 Tel. 435-628-0606 Fax 435-656-2286
 www.ivins.com

GEOTECHNICAL REPORT CHECK LIST SUBMIT WITH PRELIMINARY PLAN

Overview:

The geotechnical report is to be submitted with the preliminary plan. It is to be prepared by and stamped by a licensed geotechnical engineer. The purpose of the report is to evaluate the existing soil conditions of the project site prior to new development

Required Extent and Depth of Exploration:

- Minimum of 1 test hole per acre, Minimum of 3 test holes per site, whichever is higher.
- Minimum 25 feet depth for basement foundations
- Minimum 15 feet depth for slab on grade foundations, at least one test hole must be 25 feet depth for every 5 acres.
- If any test hole detects expansive soils, then all proposed building pads on the site must have separate test hole.

Site Area: _____ acres Expansive Soils Present? _____yes _____no

No. of holes with 15' min depth: _____ No. of holes with 25' min depth: _____

Report should include the following:

Descriptions of:

- Generalized site conditions
- Surface and subsurface conditions

Recommendations for:

- Site preparation
- Excavation
- Grading
- Structural fill
- Foundation design
- Seismic considerations
- Concrete design
- Concrete and metal corrosion protection
- Pavement design for all categories of roads using the Traffic Index as given below:

Classification	Traffic Index	Classification	Traffic Index
Residential Standard	5	Minor Arterial	7
Residential Collector	5	Major Arterial	8
Minor Collector	5.5	Commercial Local	10
Major Collector	6	Industrial Local	10

- Soil moisture control

Exhibits and appendices showing:

- Vicinity map
- Site plan showing boring locations
- Boring logs
- Test results



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WATER USAGE FORM SUBMIT WITH PRELIMINARY PLAN

SUBDIVISION NAME: _____

Number of Equivalent Residential Units (ERUs) _____

Total Subdivision Acreage: _____ acres Estimated Irrigated Acreage: _____ acres

Annual Water Usage:

Indoor: 0.45 AF/ERU X ERUs = _____ acre-feet

Outdoor: 3.26 AF/Irr. Ac. X Irrigated Acreage = _____ acre-feet

Total: Indoor + Outdoor = _____ acre-feet

Peak Day Demand:

Indoor: 0.56 gpm/ERU X ERUs = _____ gpm

Outdoor: 4.9 gpm/Irr. Ac. X Irrigated Acreage = _____ gpm

Total: Indoor + Outdoor = _____ gpm

Peak Instantaneous Demand:

Indoor: 10.8 x (ERUs)^{0.64} = _____ gpm

Outdoor: 9.8 gpm/Irr. Ac. X Irrigated Acreage = _____ gpm

Total: Indoor + Outdoor = _____ gpm

Storage Requirement:

Indoor: 400 gal/ERU X ERUs = _____ gallons

Outdoor: 4,964 gal/Irr. Ac. X Irrigated Acreage = _____ gallons

Total: Indoor + Outdoor = _____ gallons

Fire Flow Calculation (IFC Appendix B):

Building Type (See IBC) _____

Maximum Building Area _____ square feet

Fire Flow Requirement (see IFC Table B105.1) _____ gpm

Fire Flow Duration (see IFC Table B105.1) _____ hours

Fire Storage Requirement _____ gallons

Notes:

1. Refer to Utah Administrative Rules R309-510
2. If irrigated acreage is less than 0.125 acres per lot, then provide justification.

Abbreviations:

- ERU: Equivalent Residential Unit
- Irr. Ac.: Irrigated Acres
- gpm: gallons per minute
- IFC: 2003 International Fire Code
- IBC: 2003 International Building Code

NARRATIVE

GRID COORDINATES ARE BASED UPON UTM COORDINATE SYSTEM OF 1994 SOUTH ZONE #4303. VERTICAL DATUM IS NAVD 88 AND ARE GPS ELEVATIONS (ORTHO) THE AVERAGE SCALE FACTOR TO CONVERT THE DISTANCES FROM GROUND TO GRID IS 1.0001101.
 GROUND COORDINATES ARE BASED UPON AN ASSUMED DATUM OF NORTING 50,000, EASTING 50,000, ON GRID POINT #4045 AND ARE GROUND BASED COORDINATES. SURVEYORS USING THIS INFORMATION SHOULD VERIFY THE COORDINATES LISTED.
 THE LINENWORK SHOWN IN THE DRAWING IS FOR CONVENIENCE OF LOCATING THE MONUMENTS ONLY AND ARE NOT TO REPRESENT ACTUAL PROPERTY LINES.

SURVEYOR'S CERTIFICATE

I, SCOTT P. WOOLSEY, DO HEREBY CERTIFY THAT I AM A REGISTERED LAND SURVEYOR AND THAT I HOLD CERTIFICATE NO. 12499 AS PREScribed UNDER THE LAWS OF THE STATE OF UTAH AND THAT THIS IS A TRUE AND CORRECT REPRESENTATION OF SAID SURVEY.



DATE: _____ SCOTT P. WOOLSEY P.L.S. 174919

MONUMENTATION DATA

POINT#	GRID NORTHING	GRID EASTING	ELEVATION	DESCRIPTION	GROUND NORTHING	GROUND EASTING
4001	10031333.780	999044.882	2983.30	NSS BM G365	48768.66	43679.61
4004	10029297.360	1006578.433	2965.19	NSS BM G365	42552.52	51213.99
4007	10029297.360	1002677.935	3020.12	NSS BM F365	45326.91	47312.95
4008	10029297.360	999297.480	3022.82	N 1/4 SEC. 19 (1980 BLM B/C)	46174.37	47312.95
4010	10043307.490	994989.226	3353.55	NW COR. SEC. 25 (G.O. B/C)	60744.68	39674.00
4013	10043307.490	994989.226	3353.12	NW COR. SEC. 25 (G.O. B/C)	58000.90	39660.90
4014	10043307.490	994989.226	3353.12	NW COR. SEC. 25 (G.O. B/C)	58000.90	39660.90
4016	10035319.430	994799.775	3070.39	W 1/4 SEC. 36 (G.O. B/C)	52915.85	39433.98
4017	10037408.810	994799.775	3199.29	SW COR. SEC. 36 (G.O. B/C)	50786.80	39371.02
4018	10037408.810	994799.775	3199.29	SW COR. SEC. 36 (G.O. B/C)	50786.80	39371.02
4019	10037408.810	994799.775	3199.29	SW COR. SEC. 36 (G.O. B/C)	50786.80	39371.02
4020	10027296.670	994646.456	3046.74	SW COR. SEC. 1 (G.O. B/C)	44431.95	39253.70
4022	10027296.670	997382.904	2990.38	S 1/4 SEC. 36 (G.O. B/C)	50716.46	42017.45
4023	10037958.770	997504.895	3138.30	1/4 2S SPIKE	55395.37	42193.45
4024	10034244.270	997629.908	3335.76	N 1/4 SEC. 25 (G.O. B/C)	60891.45	42264.48
4025	10043307.490	1000271.452	3315.73	NW COR. SEC. 25 (G.O. B/C)	60813.60	44808.11
4027	10040445.468	1000207.977	3201.55	WINTERS COR. (1912 G.O. B/C)	57882.20	44842.74
4028	10038035.480	1000148.781	3173.80	SW COR. SEC. 30 (1912 G.O. B/C)	55489.09	44733.61
4029	10037989.240	1000148.781	3170.57	NE COR. SEC. 36 (1912 G.O. B/C)	44701.64	44577.33
4030	10037989.240	1000148.781	3170.57	NE COR. SEC. 36 (1912 G.O. B/C)	44701.64	44577.33
4031	10027296.670	999984.262	3023.44	W 1/4 SEC. 6 (1988 BLM B/C)	50585.12	44672.20
4032	10027296.670	999984.262	3023.44	W 1/4 SEC. 6 (1988 BLM B/C)	50585.12	44672.20
4033	10027296.670	999984.262	3023.44	W 1/4 SEC. 6 (1988 BLM B/C)	50585.12	44672.20
4034	10027296.670	999984.262	3023.44	W 1/4 SEC. 6 (1988 BLM B/C)	50585.12	44672.20
4037	10027296.670	999984.262	3023.44	W 1/4 SEC. 6 (1988 BLM B/C)	50585.12	44672.20
4038	10032891.410	1002681.459	3072.11	S 1/4 SEC. 6 (1988 BLM B/C)	50224.48	47282.05
4040	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4045	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4046	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4047	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4048	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4049	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4050	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4051	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4052	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4053	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4054	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4055	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4056	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4057	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4058	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4059	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4060	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4061	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4062	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4063	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4064	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4065	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4066	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4067	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4068	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4069	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4070	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4071	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4072	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4073	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4074	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4075	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4076	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4077	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4078	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4079	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4080	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4081	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4082	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4083	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4084	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4085	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4086	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4087	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4088	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4089	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4090	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4091	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4092	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4093	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4094	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4095	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4096	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4097	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4098	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4099	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4100	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4101	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4102	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4103	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4104	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4105	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4106	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4107	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4108	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4109	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4110	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4111	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4112	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4113	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4114	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4115	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4116	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4117	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4118	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4119	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4120	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4121	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4122	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4123	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4124	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4125	10032968.655	1003645.235	3268.11	S 1/4 SEC. 30 (1912 G.O. B/C)	47881.29	55070.19
4126	10032968.655					



Public Works Department

55 North Main Street
Ivins, Utah 84738
(435) 634-0689

Preliminary/Final Drainage Report Checklist

This sheet shall be provided with each drainage report. All items should be checked off.

Name of Development: _____

Size of Development: _____ acres

Name of Professional Engineer: _____

Name of Engineering Company: _____

Phone: _____ Email: _____

Check off each submitted item:

Drainage Report

Preliminary Final

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Title page showing project name, date, preparers name, seal and signature. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of property, area, existing site conditions including all existing drainage facilities such as ditches, canals, washes, structures, etc. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of off-site drainage upstream and downstream. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of on-site drainage. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of master planned drainage and how development conforms to the Ivins City Drainage Master Plan. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of FEMA floodplain, if applicable. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of other drainage studies that affect the site. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of proposed drainage facilities. |
| <input type="checkbox"/> | <input type="checkbox"/> | Description of design runoff computations and methods. |
| | <input type="checkbox"/> | Description of drainage facility design computations. |
| | <input type="checkbox"/> | Results of percolation tests for any retention/detention ponds. |

- Description of all easements and rights-of-way required.
- Description of FEMA floodway and floodplain calculations, if applicable.
- Conclusions stating compliance with drainage requirements and opinion of effectiveness of proposed drainage facilities and accuracy of calculations.
- Appendices showing all applicable reference information, including all model input and output files and results with appropriate explanations.

Drainage Plan

- Submitted on separate 11"x 17" sheets
- Submitted on separate 24"x 36" sheets

A separate drainage plan for the following scenarios:

- Existing off-site and on-site conditions.
- Existing off-site and developed on-site conditions.
- Developed off-site and on-site conditions.

Shows the following information:

- Existing and proposed property lines.
- Existing and proposed 2' contours.
- Existing and proposed streets, easements, and rights-of-way.
- Existing drainage facilities.
- FEMA floodplain, floodway and meander boundaries.
- Drainage basin boundaries and subbasin boundaries.
- Existing flow patterns and paths.
- Proposed flow patterns and paths.
- Location of proposed drainage facilities.
- Size of proposed drainage facilities.
- Details of proposed drainage facilities.

- Location of drainage easements required.
- Scale, north arrow, legend, title block showing project name, date, preparers name, seal and signature.

Hydrology and Hydraulic Calculations

- Rainfall data (i.e. sources for rainfall depth and durations used).
- Landuse data (i.e. sources for curve numbers on other landuse coefficients).
- Time of concentration calculations.
- Hydrology calculations (or if a computer model is used, provide all input and output).
- Ditch/channel capacity calculations.
- Culvert capacity calculations.
- Street flow capacity calculations.
- Inlet capacity calculations.
- Detention and outlet design calculations (area/storage/discharge rating curves).
- Pipe capacity calculations.

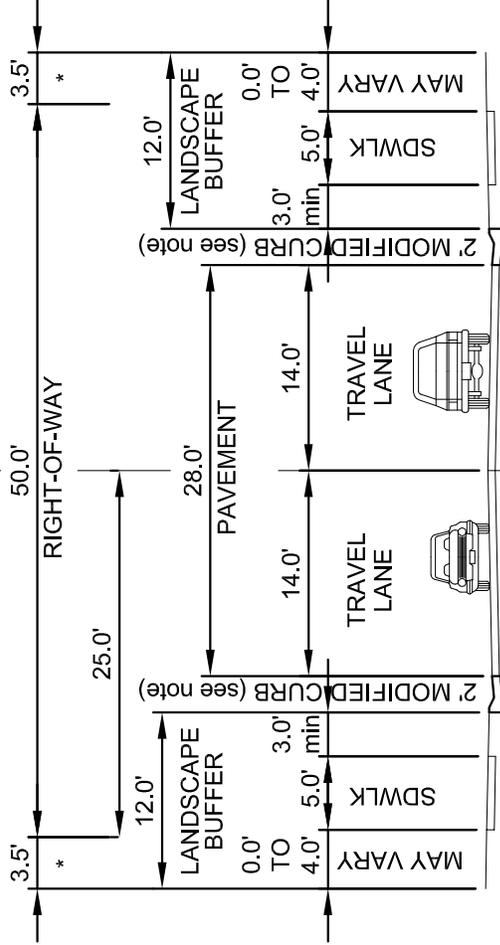


Engineer stamp & signature here.

NOTE

1. Meandering sidewalk recommended where possible. Meander sidewalk through landscape buffer area.
2. Sidewalk may undulate but must meet clear zone requirements.
3. The City may require that the 2' modified curb be substituted by a 2.5' high back curb when
 - road is curvilinear and grade has portions steeper than 2 percent;
 - road is receiving water from an intersecting road or other drainage feature that has an apparent risk of storm water jumping the curb due to high velocities; or
 - a substantive drainage benefit is determined per approved drainage studies.

* Sidewalk easement may be required for meandering sidewalks.



RESIDENTIAL STANDARD 50'

SCALE
NONE
DATE
Sept. 10, 2008

HORROCKS
ENGINEERS

285 WEST TABERNACLE
SUITE 300
ST. GEORGE, UT 84770
(425) 986-7888



Iwins City

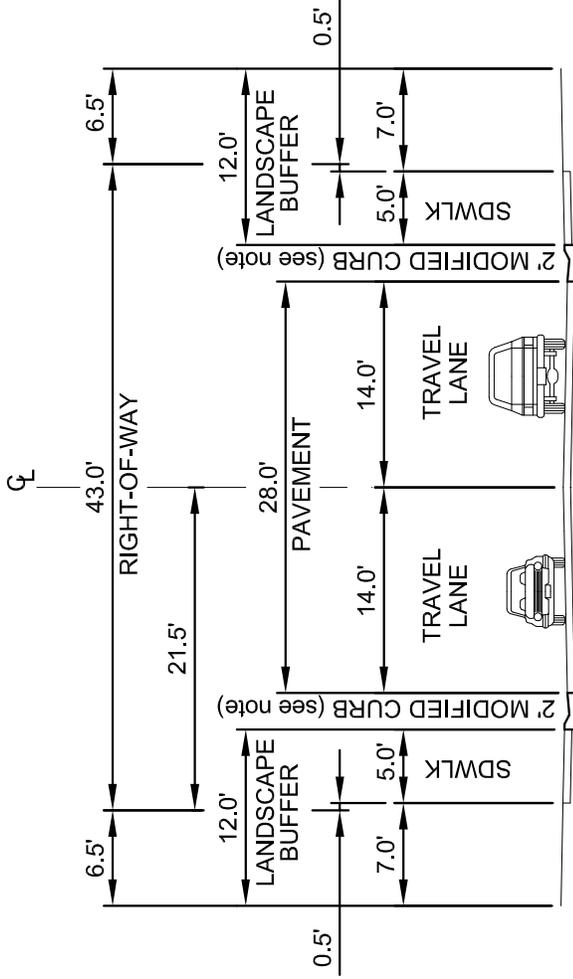
RESIDENTIAL STANDARD 50'

CROSS SECTION NO.

1.1

NOTE

- The City may require that the 2' modified curb be substituted by a 2.5' high back curb when
 - road is curvilinear and grade has portions steeper than 2 percent,
 - road is receiving water from an intersecting road or other drainage feature that has an apparent risk of storm water jumping the curb due to high velocities, or
 - a substantive drainage benefit is determined per approved drainage studies.
- Where a 2.5' high back curb is required, the sidewalk may be reduced to 4.5' width.



**RESIDENTIAL
ALTERNATIVE 43'**

SCALE
NONE
DATE
Sept. 10, 2008

HORROCKS
ENGINEERS

285 WEST TABERNACLE
SUITE 300
ST. GEORGE, UT 84770
(425) 986-7888

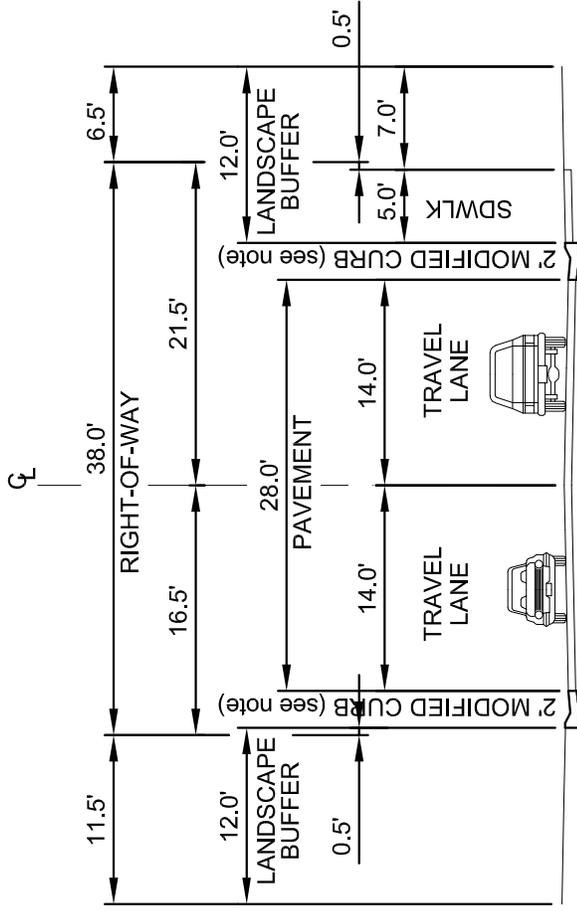


IVINS City
RESIDENTIAL ALTERNATIVE 43'

CROSS SECTION NO.
1.2

NOTE

- The City may require that the 2' modified curb be substituted by a 2.5' high back curb when
 - road is curvilinear and grade has portions steeper than 2 percent,
 - road is receiving water from an intersecting road or other drainage feature that has an apparent risk of storm water jumping the curb due to high velocities, or
 - a substantive drainage benefit is determined per approved drainage studies.
- Where a 2.5' high back curb is required, the sidewalk may be reduced to 4.5' width.

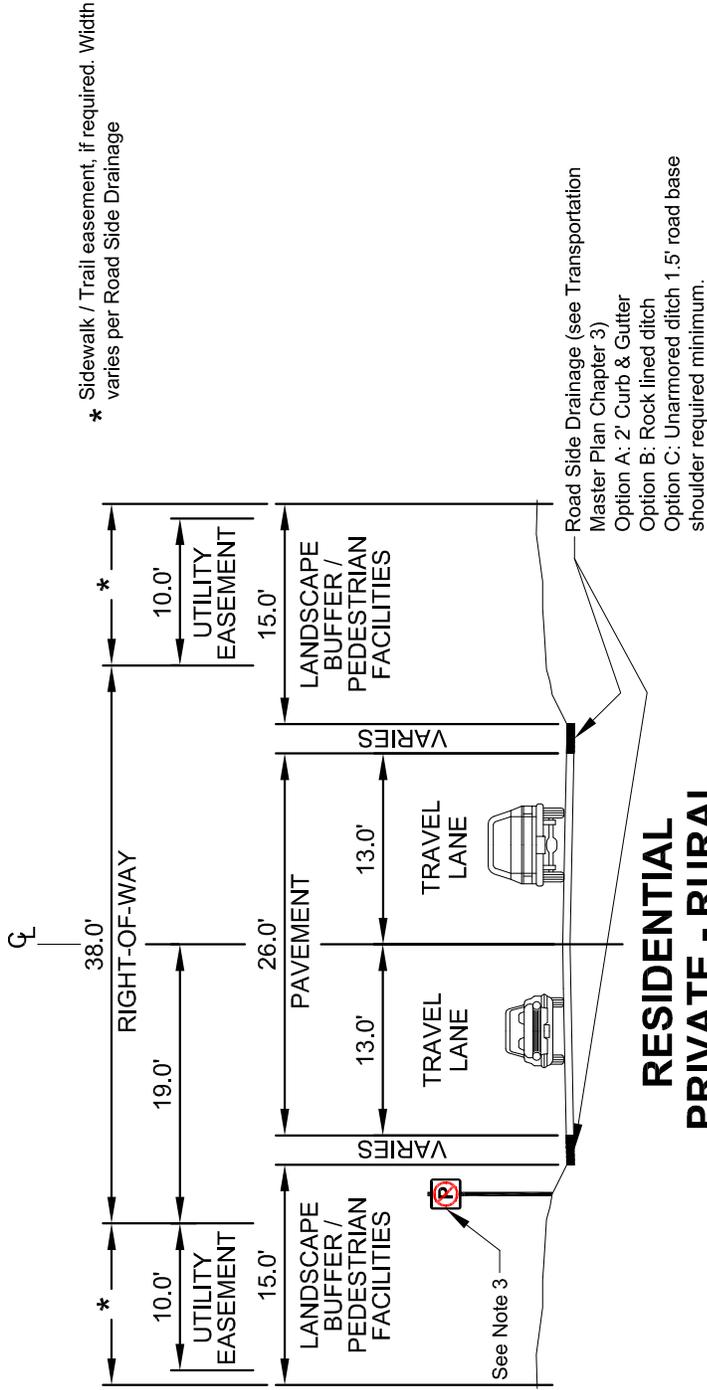


RESIDENTIAL ALTERNATIVE 38'

SCALE NONE DATE Sept. 10, 2008	HORROCKS ENGINEERS	285 WEST TABERNACLE SUITE 300 ST. GEORGE, UT 84770 (425) 986-7888		Ivins City RESIDENTIAL ALTERNATIVE 38'	CROSS SECTION NO. 1.3

NOTE

1. Pedestrian facilities required on rural streets per the Transportation Master Plan Chapter 3. Sidewalk/trail shall be located within landscape buffer area, meandering where possible.
2. Residential driveways shall be constructed to keep drainage within the roadway or natural drainage to prevent flooding of private property.
3. When driveable surface width (asphalt + shoulders) is 32 feet or less, "No Parking" signs shall be installed on one side of the road per adopted fire code. Driveable surface shall not be less than 29 feet.
4. Pedestrian facilities are not required when traffic studies show a road has a volume of less than 200 vehicles per day. Otherwise, an 8' wide asphalt path on one side, or a 5' concrete sidewalk on both sides shall be installed.



* Sidewalk / Trail easement, if required. Width varies per Road Side Drainage

RESIDENTIAL PRIVATE - RURAL

SCALE
NONE
DATE
Dec. 22, 2008

HORROCKS
ENGINEERS

285 WEST TABERNAACLE
SUITE 300
ST. GEORGE, UT 84770
(425) 986-7888



Invs City
RESIDENTIAL PRIVATE RURAL

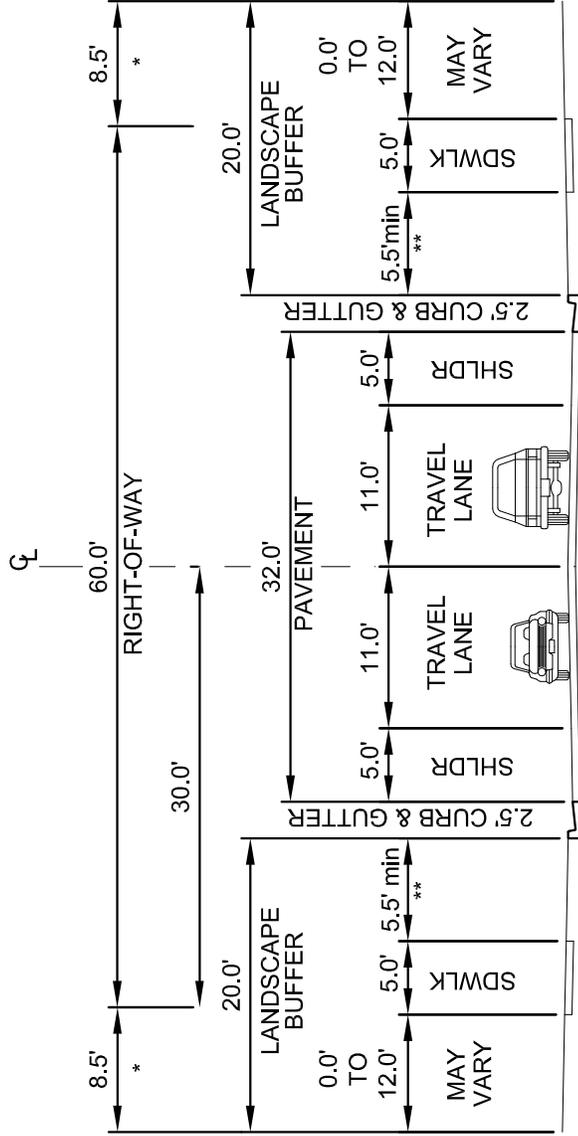
CROSS SECTION NO.
2

NOTE

1. Meandering sidewalk recommended where possible. Meander sidewalk through landscape buffer area.
2. Sidewalk may undulate but must meet clear zone requirements.
3. 5' Shoulder may be striped for a bicycle lane where indicated.

* Sidewalk easement may be required for meandering sidewalks.

** For meandering sidewalks, parkstrip width will vary with a required minimum width at closest point to be 3.0'.

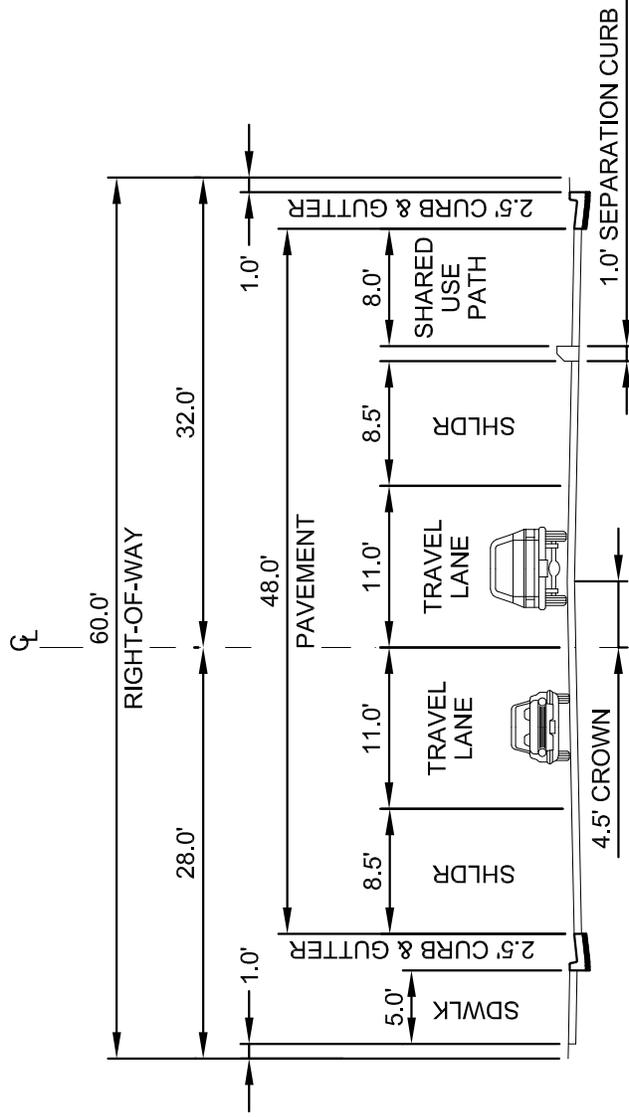


MINOR COLLECTOR

SCALE NONE	DATE Sept. 10, 2008	 HORROCKS ENGINEERS	265 WEST TABERNACLE SUITE 300 ST. GEORGE, UT 84770 (425) 966-7888	 BEYOND THE IVINS TOWN BIG RED	Ivins City	CROSS SECTION NO. 4
					MINOR COLLECTOR	

NOTE

- 1. 1' separation curb shall not be continuous through residential drive ways.



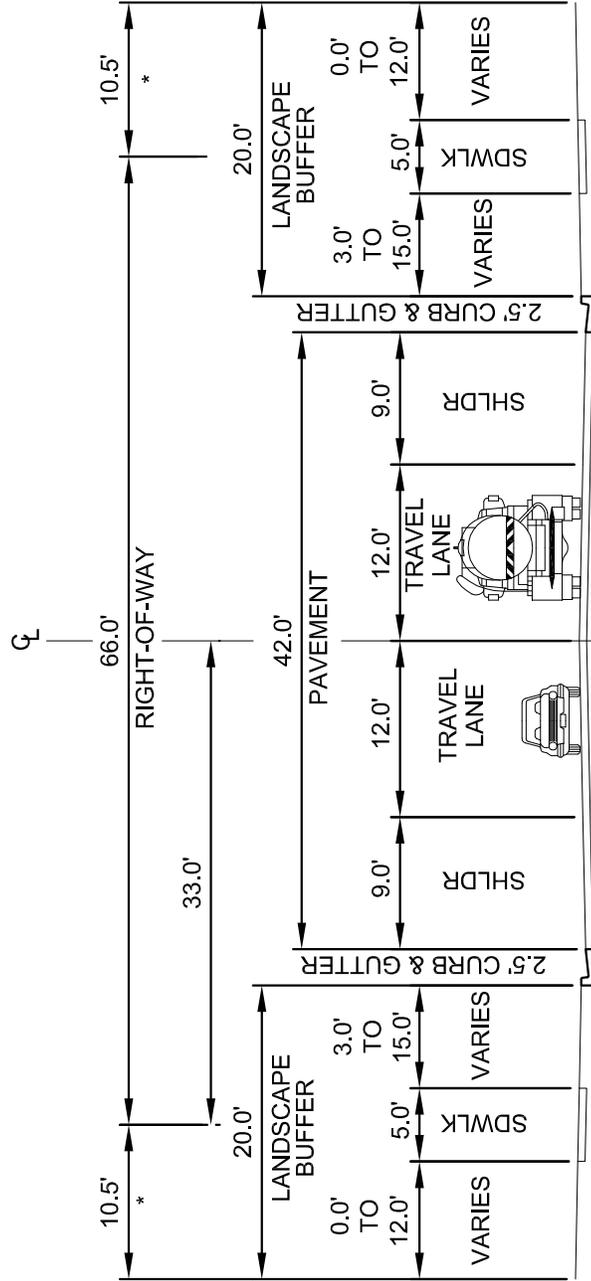
**MINOR COLLECTOR -
PUERTO DRIVE**

HORROCKS  ENGINEERS	SCALE NONE	285 WEST TABERNACLE SUITE 300 ST. GEORGE, UT 84770 (425) 986-7888		Ivins City	CROSS SECTION NO. 5
	DATE Sept. 10, 2008	MINOR COLLECTOR - PUERTO DRIVE	MINOR COLLECTOR - PUERTO DRIVE		

NOTE

1. Meandering sidewalk/trail required. Meander sidewalk through landscape buffer area.
2. Sidewalk may undulate but must meet clear zone requirements.
3. 9' shoulder with 2' of gutter pan may be separated into a 4' bike lane and 7' parking where indicated on the Ivins City Bike Lane Plan.

* Where homes or commercial sites do not front street, landscape buffer must be dedicated to City.



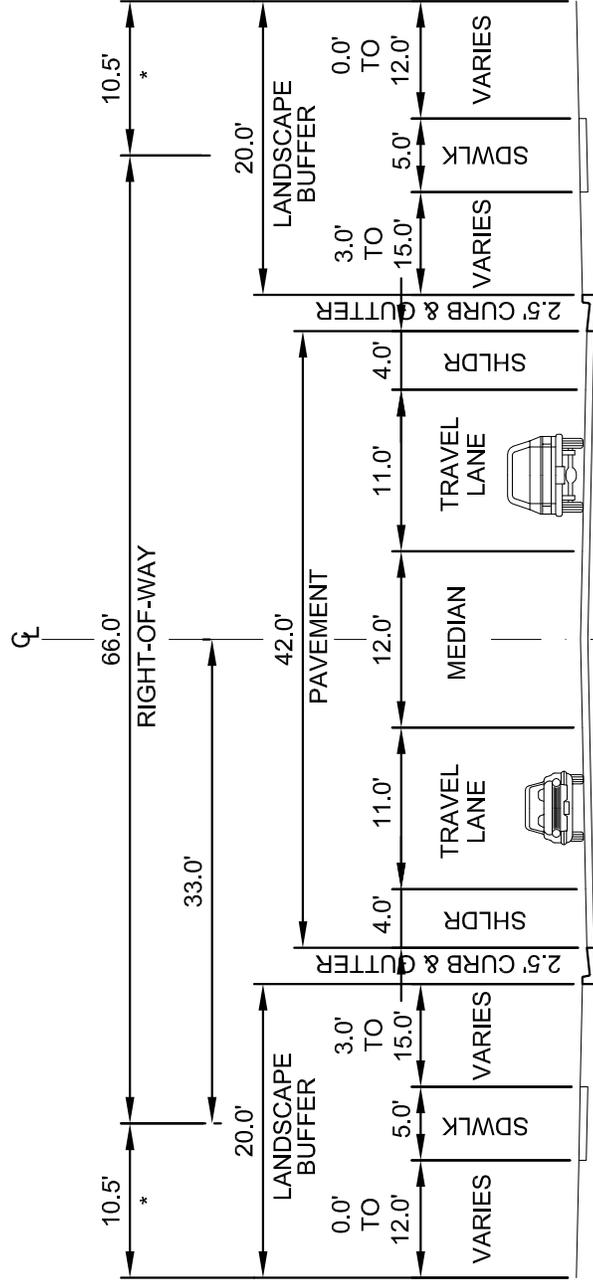
**MAJOR COLLECTOR
(STREET PARKING)**

SCALE NONE	DATE Sept. 10, 2008		285 WEST TABERNAACLE SUITE 300 ST. GEORGE, UT 84770 (425) 986-7888		Ivins City	CROSS SECTION NO. 6
					MAJOR COLLECTOR (STREET PARKING)	

NOTE

1. Meandering sidewalk required. Meander sidewalk through landscape buffer area.
2. Sidewalk may undulate but must meet clear zone requirements.
3. 4' Shoulder may be striped for a bicycle lane where indicated.

* Where homes or commercial sites do not front street, landscape buffer must be dedicated to City.



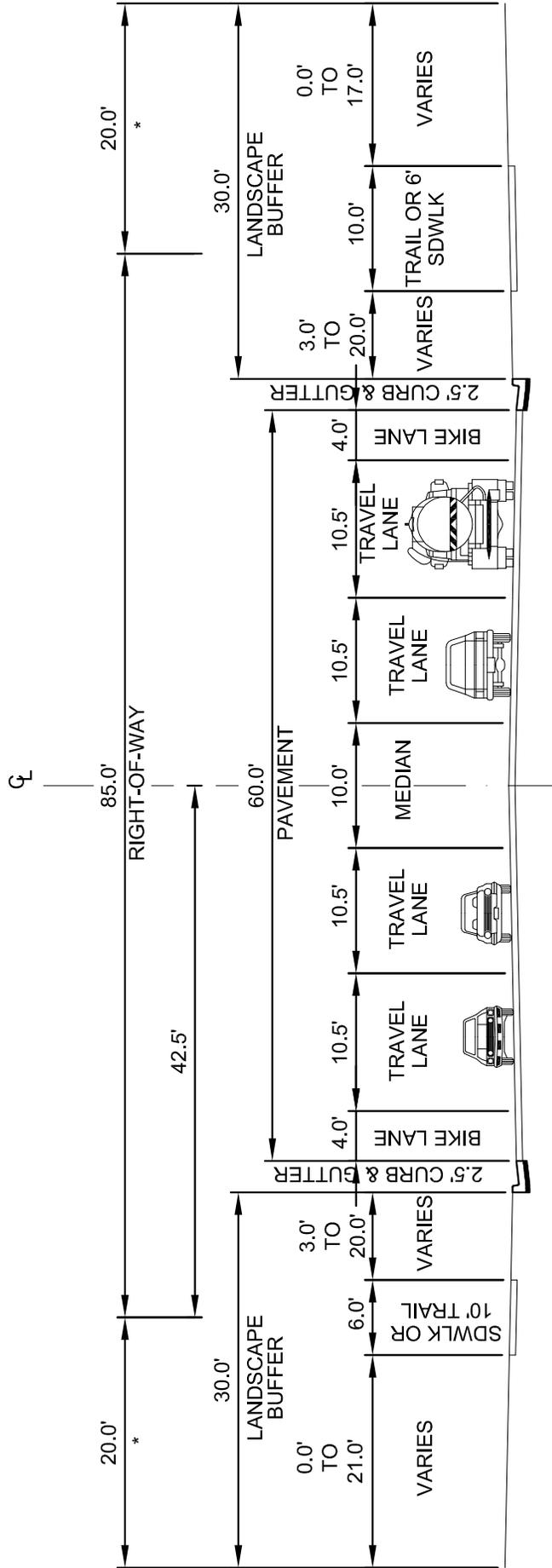
**MAJOR COLLECTOR
(CENTER LANE STRIPING)**

SCALE NONE	DATE Sept. 10, 2008	 HORROCKS ENGINEERS	285 WEST TABERNACLE SUITE 300 ST. GEORGE, UT 84770 (425) 986-7888	 Ivins City MAJOR COLLECTOR (CENTER LANE STRIPING)	CROSS SECTION NO.
					7

NOTE

1. Meandering sidewalk required. Meander sidewalk through landscape buffer area.
2. Sidewalk may undulate but must meet clear zone requirements.
3. See city Trail Map for trail locations.
4. Additional width will be required at intersections for a 12-foot right turn lane as approved by the City Engineer.

* Where homes or commercial sites do not front street, landscape buffer must be dedicated to City.



**MINOR ARTERIAL -
CENTER STREET**

SCALE
NONE
DATE
Sept. 10, 2008

HORROCKS
ENGINEERS

285 WEST TABERNAACLE
SUITE 300
ST. GEORGE, UT 84770
(425) 966-7868



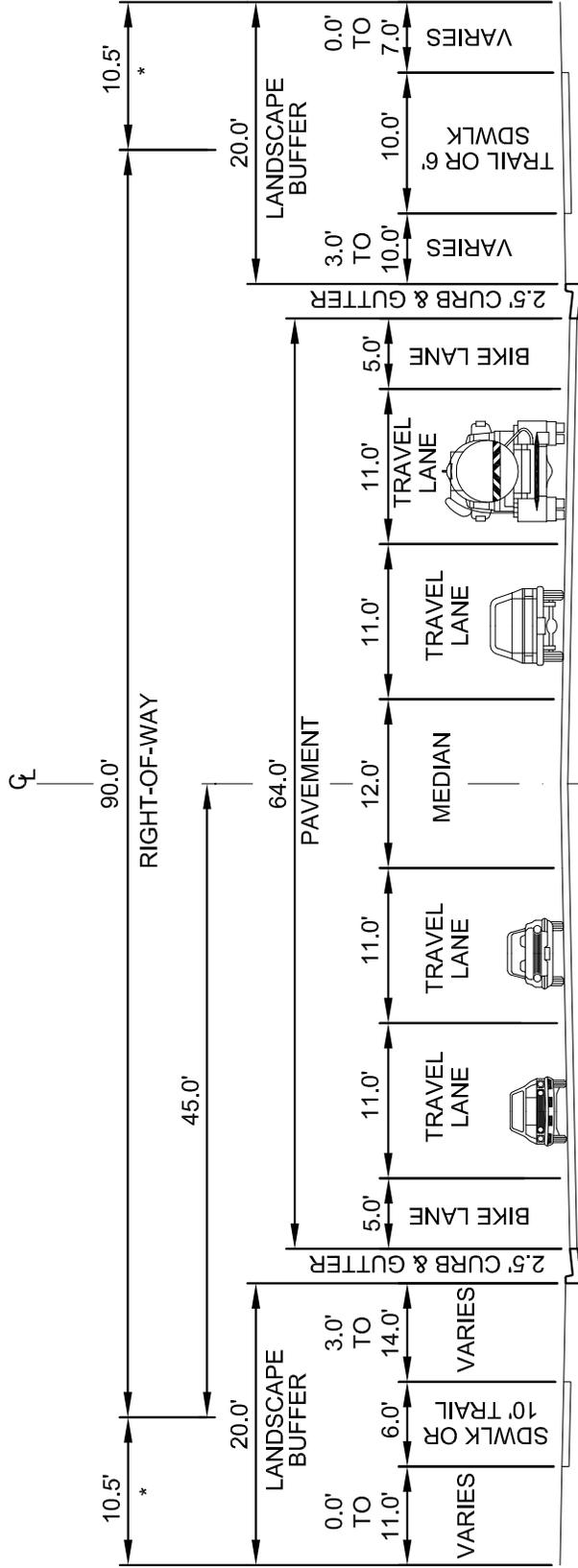
Ivins City
MINOR ARTERIAL - CENTER STREET

CROSS SECTION NO.
8

NOTE

1. Meandering sidewalk required. Meander sidewalk through landscape buffer area.
2. Sidewalk may undulate but must meet clear zone requirements.
3. See city Trail Map for trail locations.

- * Where homes or commercial sites do not front street, landscape buffer must be dedicated to City.
- ** Parkstrip minimum width may be 3.0' for a meandering sidewalk.



**MINOR ARTERIAL -
WESTERN CORRIDOR**

CROSS SECTION NO. **9**

Ivins City
MINOR ARTERIAL - WESTERN CORRIDOR



285 WEST TABERNACLE
SUITE 300
ST. GEORGE, UT 84770
(425) 965-7888

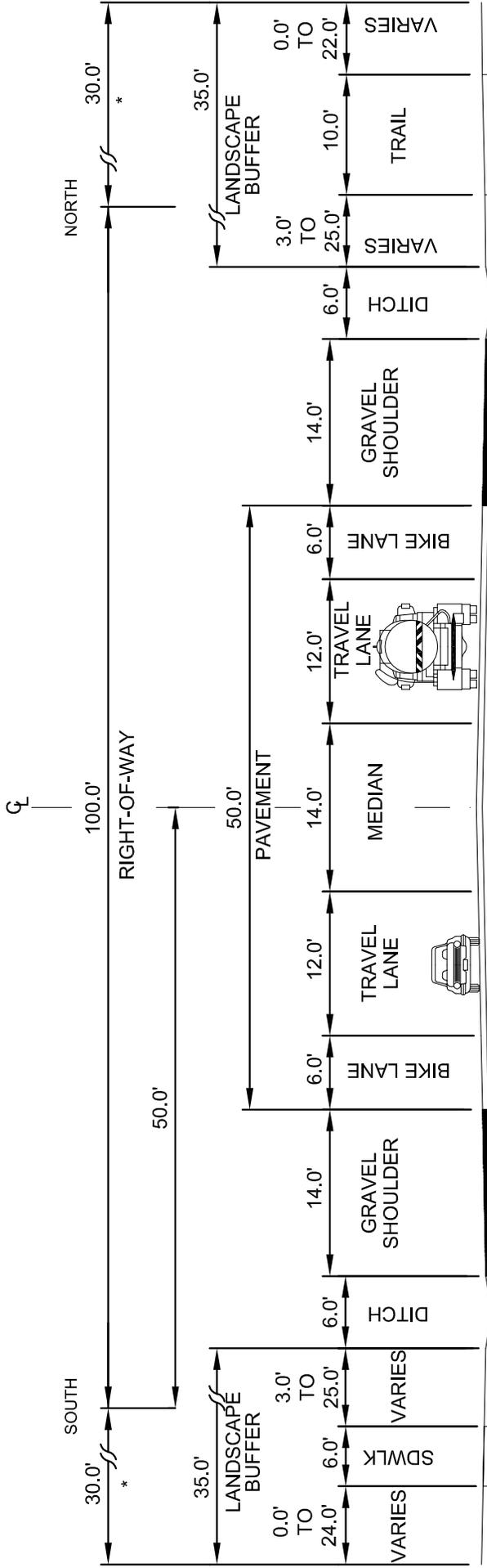
HORROCKS
ENGINEERS

SCALE: NONE
DATE: Dec. 02, 2008

NOTE

1. Meandering sidewalk/trail required. Meander sidewalk through landscape buffer area.
2. Sidewalk may undulate but must meet clear zone requirements.
3. See city Trail Map for trail locations.

* Where homes or commercial sites do not front street, landscape buffer must be dedicated to City.



**MAJOR ARTERIAL -
OLD HIGHWAY 91
(3-LANE)**

CROSS SECTION NO. **10**

Ivins City
MAJOR ARTERIAL - OLD HIGHWAY 91 (3-LANE)



285 WEST TABERNACLE
SUITE 300
ST. GEORGE UT 84770
(425) 966-7888

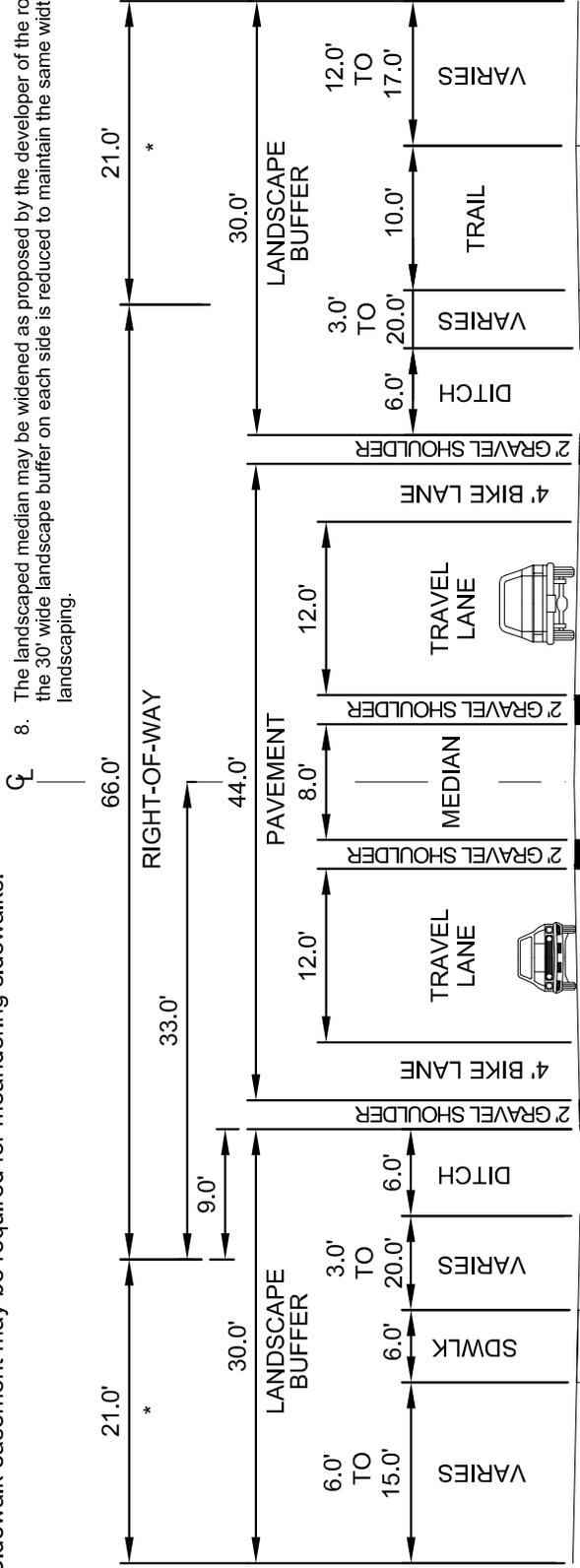
HORROCKS
ENGINEERS

SCALE
NONE
DATE
Sept. 10, 2008

NOTE

1. Trails and sidewalks may undulate but must meet clear zone requirements.
2. See city Trail Map for trail locations.
3. Where possible meander sidewalk through landscape buffer area.
4. A 2.5' high-back curb may be substituted for the roadside ditch and may be required if specified by a drainage study.
5. Follow drainage requirements for roadside ditch design.
6. An alternate would be to omit 5' sidewalk on one side of the street if it is shown sidewalk would be rarely used to not warrant expense based on approval of the city engineer. Homes or other structures fronting a street exclude the possibility of this alternate.
7. An alternate would be to replace the 5' sidewalk with a 10' trail as approved by the City Engineer.
8. The landscaped median may be widened as proposed by the developer of the road such that the 30' wide landscape buffer on each side is reduced to maintain the same width of total landscaping.

* Sidewalk easement may be required for meandering sidewalks.



**MAJOR COLLECTOR -
LANDSCAPED MEDIAN IN RURAL ZONE**

SCALE
NONE
DATE
Dec. 18, 2008

HORROCKS
ENGINEERS

285 WEST TABERNACLE
SUITE 300
ST. GEORGE, UT 84770
(425) 986-7888



Ivins City

MAJOR COLLECTOR - LANDSCAPED MEDIAN

CROSS SECTION NO.

12



Public Works Department

55 North Main Street
Ivins, Utah 84738
(435) 643-0689

TIS Report Format

I. INTRODUCTION AND SUMMARY

1. Purpose of Report and Study Objectives
2. Executive Summary
 - Site Location and Study Area
 - Development Description
 - Principal Findings
 - Conclusions
 - Recommendations

II. PROPOSED DEVELOPMENT

1. Off-Site Development
2. Description of On-Site Development
 - Land Use and Intensity
 - Location
 - Site Plan
 - Zoning
 - Development Phasing and Timing

III. STUDY AREA CONDITIONS

1. Study Area
 - Area of Significant Traffic Impact
 - Influence Area
2. Land Use
 - Existing Land Use and Zoning
 - Anticipated Future Development
3. Site Accessibility
 - Existing and Future Area Roadway System
 - Traffic Volumes and Conditions
 - Access Geometrics
 - Other as applicable

IV. ANALYSIS OF EXISTING CONDITIONS

1. Physical Characteristics
 - Roadway Characteristics
 - Traffic Control Devices
 - Pedestrian/Bicycle Facilities
2. Traffic Volumes
 - Daily, Morning, Afternoon and Saturday Peak Periods (as applicable)
3. Level of Service
 - Morning, Afternoon and Saturday Peak Hour (as applicable)
4. Safety

V. PROJECTED TRAFFIC

1. Site Traffic Forecasts (each horizon year)
 - Trip Generation
 - Mode Split
 - Pass-by Traffic (if applicable)
 - Trip Distribution
 - Trip Assignment
2. Non-Site Traffic Forecasting (each horizon year)
 - Projections of Non-site (Background) Traffic (methodology for the projections shall receive prior approval of City)
3. Total Traffic (each horizon year)

VI. TRAFFIC AND IMPROVEMENT ANALYSIS

1. Site Access
2. Capacity and Level of Service Analysis
 - Without Project (for each horizon year including any programmed improvements)
 - With Project (for each horizon year, including any programmed improvements)
3. Roadway Improvements
 - Improvements Programmed to Accommodate Non-site (Background) Traffic
 - Additional Alternative Improvements to Accommodate Site Traffic
4. Traffic Safety
 - Sight Distance
 - Acceleration/Deceleration Lanes, Left-Turn Lanes
 - Adequacy of Location and Design of Driveway Access
5. Pedestrian Considerations
6. Speed Considerations
7. Traffic Control Needs
8. Traffic Signal Needs (base plus each year, in five-year horizon)
9. Site Circulation and Parking

VII. FINDINGS

1. Site Accessibility
2. Traffic Impacts
3. Need for Improvements
4. Compliance with Applicable Local Codes

VIII. RECOMMENDATIONS/CONCLUSIONS

1. Site Access/Circulation Plan
2. Roadway Improvements
 - On-Site
 - Off-Site
 - Phasing (as applicable)

3. Transportation System Management Actions (as applicable)
4. Other

IX. APPENDICES

1. Existing Traffic Volume Summary
2. Trip Generation/Trip Distribution Analysis
3. Capacity Analyses Worksheets
4. Traffic Signal Needs Studies

X. FIGURES AND TABLES

1. The following items shall be documented in the text or Appendices
 - Site Location
 - Site Plan
 - Existing Transportation System
 - Existing Peak Hour Turning Volumes
 - Estimated Site Traffic Generation
 - Directional Distribution of Site Traffic
 - Site Traffic
 - Non-Site Traffic
 - Total Future Traffic
 - Projected Levels of Service
 - Recommended Improvements

(For Category 1, many of the items may be documented within the text. For other categories the items shall be included in figures and/or tables that are legible.)

XI. DESIGN STANDARD REFERENCE

1. Design in accordance with current *Ivins City Standards*.
2. Conduct capacity analysis in accordance with the latest edition of the *Highway Capacity Manual*.



IVINS CITY

55 N. Main St. Ivins, UT 84738

Tel. 435-628-0606 Fax 435-656-2286

www.ivins.com

CONSTRUCTION DRAWING REVIEW REQUIREMENTS

General Overview:

- First Submittal:
 - Submit the attached Construction Drawing Checklist.
 - Submit three sets of construction drawings, copies or original, stamped by a professional engineer.
 - Submit Storm Water Pollution Prevention Plan per Utah Pollutant Discharge Elimination System (UPDES) requirements.
 - If drainage plan has changed since drainage study submitted with preliminary plan, submit a revised drainage plan or a drainage plan addendum.
 - The approximate review period for the first submittal is 14 days.
- Upon review, one set of construction drawings will be returned with markups for changes required for approval.
- Second Submittal:
 - Submit markup copy of construction drawings from previous submittal.
 - Submit one original set of construction drawings with all utility signatures and professional engineer signature. (Two or more original sets may be submitted if the developer or engineer needs an original set for their own records).
 - Submit construction cost estimate.
 - The approximate review period for the second submittal is 7 days.
- Upon review, if all marked changes were corrected in the second submittal, the original set of construction drawings will be returned with all of the city signatures.
- Final Submittal:
 - Submit the original set of construction drawings.
 - Submit two additional copies of the original construction drawings.
 - Submit an electronic version of the construction drawings and final plat as an Auto CAD file. Auto CAD 2006 or an older version is acceptable.

Construction Plans

General Standards:

- Drawing Size: 24"x 36"
- Title block is located on the right side of sheet and includes:
 - Project title
 - Sheet title
 - Sheet number
 - Name, address, and phone number of engineer
- The engineer's stamp is required on all sheets.
- Minimum text size is 0.08"

Construction Plans must include:

- Title sheet which includes:
 - Sheet index
 - Project title
 - Vicinity map
 - Engineer's certification
 - Project benchmark information
 - Basis of bearings
 - General project boundary and layout map
 - Utility and City signature block
 - Required City Signatures: City Engineer, Public Works Director, Building and Zoning Administrator, Public Safety Officer, Parks and Recreation Director.
 - Required Utility Signatures: Gas, Power, Phone, Postmaster, Cable, Others if applicable (i.e. Ivins Irrigation Co., Interlynx Fiber Optics, St. George City, Santa Clara City, WCWCD).
- Construction Notes Sheet
- Erosion Control Plan and Details
 - Shows the following:
 - Management practices to be employed
 - Temporary and permanent facilities to be installed to control soil erosion and prevent sedimentation impacts to adjacent properties and public facilities during and after construction
- Grading Plan and Cross Sections
 - Minimum scale is 1"=50'
 - Shows the following:
 - Relationship of street to curb, gutter, and sidewalk
 - Top of curb elevations at lot lines and curb returns
 - Curve data for curb returns
 - Existing and proposed contour topography
 - Slopes
 - Building pad elevations
 - Cross sections
 - Top of wall and bottom of wall elevations on retaining walls
 - Drainage flow arrows
- Utility Plans
 - Shows the size, type, and location of the following:
 - Culinary water laterals, mains, meters, valves, and fire hydrants
 - Secondary and irrigation water laterals, mains, valves, etc.

- Sewer manholes, cleanouts, and laterals
- Storm drain inlets, catch basins, manholes, headwalls, subdrains, and outfalls
- Power, natural gas, and cable television
- Street lights
- Sewers and storm drains must have a profile drawing showing depths of pipes, slopes, lengths, and clearances at all pipe crossings. This may be combined with the street profile.
- Shows existing utilities
- Street and Project Entrance Lighting Plan
- Street Plan and Profiles
 - Minimum scale is 1"=50'
 - Shows all of the following:
 - Existing profile of centerline and at both right-of-ways and labeled accordingly
 - All existing elevations
 - All existing conditions and structures
 - Stationing
 - Top back of curb elevations
 - Centerline elevations
 - Curve data
 - Typical cross section for all street sizes and variations
 - Shows Pavement and Base thickness design per Geotechnical Evaluation (include in typical cross section).
 - Benchmark location and elevation
 - Street names
 - Tapers (10:1 required at all transitions)
- Landscaping Plan
 - Includes a Planting Plan (plant list).
 - Includes an Irrigation System Plan
 - Shows all valves, controllers, and trunklines
- Detail Sheets (as needed)

Construction Drawing Checklist

Street Design

- All streets meet street design specifications for grades, centerline curve radii, rights-of-way, pavement, curb, gutter, and sidewalk dimensions shown the following table.

Street Design Standards

Street Type	Right-of-Way (feet)	Max. Grade (%)	Cul-de-sac Radius (feet)	Centerline Minimum Curvature (feet)	Design Speed (mph)	Pave-ment (feet)	Side-walk (minimum feet)	Serpentine Sidewalk (minimum feet)	Curb Return Radius (feet) ¹	Curb Type Used
Private	38	8% ²	60	70	15		4 ³	5	15	24"
Residential Standard	50	8% ²	60	100	25	27	5	5	20	24"
Residential Collector	55	8% ²	60	200	25	32	5	6	25	HB30-7 (30")
Minor Collector	60	8%	-	200	30	30	5	6	25	HB30-7 (30")
Major Collector	66	8%	-	400	35	36 min ⁴	5	6	30	HB30-7 (30")
Arterial Minor	80/85	8%	-	700	45	55-60 ⁴	5	6	35	HB30-7 (30")
Arterial Major	100	8%	-	1000	55	4	5	6	40	HB30-7 (30")
Half Width Streets	-	8%	-	-	-	27 ⁵ min.	-	-	-	-

- All streets meet intersection distance standards shown in the following table.

Access Distance From Corner According to Facility Type

Facility Type	Upstream Distance (feet)	Downstream Distance (feet)
Residential Access	50	50
Local Residential	50	50
Residential Standard	50	50
Residential Collector	100	75
Major Collector	175	150
Minor Arterial	200	185
Major Arterial	250	230

- All Street intersections are as close to 90° as possible

¹ Curb Return Radius shall use the largest street type found at the intersection

² 12% if approved for sensitive lands

³ Private roads designed with sidewalk on one side only.

⁴ See Transportation Master Plan drawings

⁵ Minimum pavement to be 27 feet or to the centerline of the street type being constructed, whichever is greater

- ❑ Cul-de-sac streets are no more than 600' long, measured from the center of intersection to center of cul-de-sac.
- ❑ Minimum pavement across cul-de-sac is 96' with no parking posted. The radius is measured to property line.

Serpentine Sidewalks

- ❑ Maximum grade of 5%, or 2% greater than the existing/proposed street grade, whichever is less, along the length of the serpentine sidewalk.
- ❑ The sidewalk is no greater than 18" above the top back of curb with a maximum slope to the curb of 3:1.
- ❑ The centerline radius of the serpentine sidewalk is no less than 50'.
- ❑ Adequate pedestrian access to the sidewalks is provided meeting ADA standards.

Sanitary Sewer

Design Flows

- ❑ All hydraulic slopes have a minimum slope as outlined in the following table.

SEWER SIZE (inches)	MINIMUM SLOPE (ft/100 feet)=%
8	.5
10	.5
12	.5
15	.45
18	.45
21	.45
>24	.4

Minimum Size and Depth

- ❑ No public sanitary sewer is less than 8" in diameter.
- ❑ No house connections are less than 4" in diameter.
- ❑ No restaurant connections are less than 6" in diameter.
- ❑ Each lateral connected to the public main serves only one residence, structure, or building.
- ❑ The depth of a sewer main, to top of pipe, is 36" or more below subgrade of roadway.

Alignment

- ❑ All sanitary sewers are laid at least 10' horizontally, measured from edge to edge, from any culinary water main.

Service Connections

- ❑ Service connections to any public sanitary sewer are a minimum of 10' from any culinary water line or tapping.
- ❑ No roof drains, foundations drains, storm drains, or sub-drains are connected to sanitary sewer system.

Manholes

- ❑ Manholes are installed at all changes in grade, size and intersections and at distances no greater than 400' apart.
- ❑ Flow lines of junction-lines entering the manhole at an angle are 0.2' higher than through-line flow line.
- ❑ Manholes for sewer mains of 10" diameter or less have a minimum of 4' inside diameter.
- ❑ Manholes for sewer mains larger than 10", over 12' deep, or where three or more sewer lines intersect (including laterals), have a minimum 5' inside diameter.

- Location and size of existing facilities are verified with city records.

Culinary Water

Minimum Size and Depth

- The minimum depth of cover (to top of pipe) for water mains is 36” below the final grade of the street.
- The minimum size of the water main is 4” in diameter.
- The minimum size of the water main serving any fire hydrant is 8” in diameter.

Valves and Hydrants

- The water system is looped and valves are spaced so that a break in any one length of main will put no more than 600’ of main, and no more than two fire hydrants out of service.
- All distribution mains connecting to larger supply mains are valved near the connection.
- All fire hydrants are valved.

Fire Hydrant Spacing and Location

- Fire hydrants are located at each intersection.
- In residential areas, fire hydrant spacing is no greater than 500’, and no house is greater than 250’ from a hydrant.
- In industrial, business, or commercial areas, fire hydrant spacing is no more than 350’ and no building is more than 175’ from a hydrant.
- All hydrants are offset a minimum of 18” from the walkway.
- All hydrants are installed on dedicated easements or public rights-of-way.
- All hydrants have a 5’ clearance on sides and front, and 3’ on rear.

Miscellaneous Water System Design Criteria

- Water mains are within a right-of-way or easement.
- Dead end mains are avoided wherever possible and if installed are less than 600’.
- Each building is served by a separate meter.
- Service line requirements are met as outlined in the following table.

Service Line	Maximum Units to be Served
1”	5
1 ½”	12
2”	20

- All water mains are laid at least 10’, measured edge to edge, from any sewer main or manhole.
- When a water main crosses over a sewer main, the water main is laid high enough that the bottom of the water main is at least 18” above the top of the sewer pipe.
- Air release-vacuum assemblies and blow off valves are provided on all mains larger than 12”.
- Location and size of existing facilities are verified with city records.

Secondary (Irrigation) Water

- The minimum depth of cover (to top of pipe) is 36” below finished grade.
- Irrigation lines are located in the roadway.
- Irrigation lines are a minimum of 3’ separation from culinary water lines.
- Location and size of existing facilities are verified with city records.

Bike Path

- Bike paths are a minimum of 10’ wide.
- Bike paths are built with a minimum of 2” of type II asphalt over 6” of base course, over prepared sub grade.

Grading per International Building Code (IBC) Appendix J

- The maximum slope of cut surfaces is 2H:1V. (IBC J106.1)
- Benching is required where the existing slope is steeper than 5H:1V and the fill is deeper than 5'. See IBC Figure J107.3.

- Required Not required
 - If benching is required, Figure J107.3 from IBC is included as a detail in construction plans.

- Top of all cut or fill slopes is setback a minimum of 2' from property line (IBC J108.2)
- Top of all cut or fill slopes higher than $h=10'$ (see IBC Figure J 108.1) is setback at a minimum of $h/5$ feet from property line. (Maximum set back is 10')

Terraces (IBC J109.2)

Terraces are required on all cut or fill slopes higher than 30 vertical feet to control surface drainage and debris

- Required Not required
- If terraces are required, the following must be checked:
- Minimum width of 6'
 - Where more than two terraces are required, one terrace, at approximately mid-height, is at least 12' wide
 - Swales or ditches are provided on terraces and meet the following requirements:
 - 5% minimum gradient.
 - Paved with a minimum of 3" thick concrete.
 - Minimum of 12" deep.
 - Minimum of 5' wide.

Interceptor drains are required along the top of cut slopes receiving drainage from a tributary wider than 40' measured horizontally.

- Required Not required
- If interceptor drains are required, they must meet the following requirements:
- Minimum of 1' deep.
 - Minimum of 3' wide.
 - Have a slope no less than 2%.
 - Paved with a minimum 3" thick concrete.

Other Grading Requirements

- Grading Plan must match plan submitted in Preliminary Plan approval.
- No grading off of property without written consent from adjacent property owner.
- Roads match close to existing grade and are not filling in excess of one foot as measured at centerline.
- No cut and fill areas with a change in grade in excess of four feet within 10 feet of property line.

Erosion Control Plan

- Erosion Control Plan is in accordance with Storm Water Pollution Prevention Plan.

If any of the above requirements cannot be met, make note of the reasons in the margins.