

537pad

**INSCRIPTION CANYON RANCH SUBDIVISION**

**P.A.D. SOUTH**

**UNIT FOUR - PHASE TWO**

**ENGINEER'S DESIGN REPORT**

**MARCH 2001**



**INSCRIPTION CANYON RANCH SUBDIVISION  
P.A.D. SOUTH - UNIT FOUR, PHASE TWO**

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**PROJECT SCOPE:**

Inscription Canyon Ranch Subdivision, Unit Four, is located in Yavapai County approximately 13 miles northwest of Prescott, Arizona, along Williamson Valley Road in a portion of Section 27, Township 16 North, Range 3 West, Gila and Salt River Meridian. The second Preliminary Plat for Phases Two, Three, and Four of Unit Four, consisting of 102 residential lots over 210 acres, was approved by the Yavapai County Board of Supervisors on December 4, 2000. Phase Two will be constructed in one phase.

**ROADWAY DESIGN:**

All roadways for Unit Four will be dedicated to the public and have been designed to Yavapai County Standards, as specified in Resolution 1036 and amended by the development agreement between Yavapai County and the developers.

Road 2 South and Iron Hawk Drive have been designated as residential collectors, with a minimum pavement width of 28 feet in a 68-foot right-of-way. Sinagua Lane and Yaqui Drive have been designated as low volume residential streets, with minimum pavement widths of 20 feet in 50-foot rights-of-way. All roads have 4-foot wide shoulders and, where necessary, roadside "V" shaped drainage channels of 2-foot depth.

On the assumption that soils will not change significantly, the structural sections for Unit Four were based on the results documented in the Soil Survey - Inscription Canyon Ranch - Unit One prepared by Engineering & Testing Consultants, Inc., (E.T.C.) on June 9, 1995, and amended by their September 18, 1996, letter. The pavement sections consist of three inches (3") asphaltic concrete (AC) over nine inches (9") of aggregate base course (ABC) for Iron Hawk Drive, and two inches (2") AC over nine inches (9") of ABC for the residential streets. Copies of the surveys are included. E.T.C. will verify the conditions during subgrade construction and recommend any modifications to the sections if warranted.

**SITE DRAINAGE:**

Stormwater runoff through and from Unit Four drains into Cooper Wash flowing north on its way to Mint Wash. The installation of roadway culverts will generally hold back or delay stormwater runoff enough to offset increases in peak discharges resulting from the development of this low density residential area.

Cooper Wash tributaries through the north half of the property drain areas greater than 40 acres, but less than 160 acres, requiring delineation of the 100-year floodplain by approximate methods. Restricted

building envelopes have been designated for those lots crossed by the approximate floodplains. These floodplains and building envelopes have been delineated on the Final Plat for the subdivision.

All but one drainage structures in Unit Four, Phase Two, have been sized to accommodate runoff generated by the 100-year event. The exception passes the 25-year event. A Phase III Drainage Report has been prepared and will be submitted separately.

### **WATER SUPPLY:**

Water will be supplied to Inscription Canyon Ranch, Unit Four, by the ICR Water User's Company. The Association's initial system consists of a well (ADWR #55-542062), a water transmission main, and a storage tank. The construction of this system was approved by the Arizona Department of Environmental Quality (ADEQ) under the file number of 95-0481. Extensions to the system have been built for ICR Units One through Three and approved by the Yavapai County Environmental Services (YCES). An extension to Phase One of Unit Four has been constructed and is in review for approval of construction.

Extensions to the system will be constructed to serve Unit Four. The hydropneumatic pumping system, constructed as part of Unit One's improvements, will need modification. The existing pumps and pressure tank will be replaced to provide adequate pressures in Phase Two. The system distributes water through eight inch (8") and six (6") inch PVC mains. According to the analysis done on the Cybernet computer program from Haested for flow in a pipe network, domestic demand is satisfied with line pressure in excess of 40 psi; and all fire hydrants are capable of producing flows in excess of 500 gpm while maintaining a minimum pressure of 20 psi. A separate report on the water system analysis will be submitted.

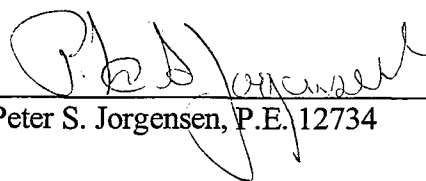
### **SEWAGE DISPOSAL:**

An Approval of Construction for the wastewater treatment plant constructed as part of Unit One's improvements has been issued by ADEQ. This plant will serve Unit Four. A Low Pressure Sanitary Sewer System (LPSS) has been selected to service Unit Four as in previous units. The procedures and computations for the design of the LPSS are included with this report.

The Low Pressure Sewer System (LPSS) branch analysis is based upon the assumption that each core pump delivers 11 gpm to the system and that a certain number of pumps are pumping simultaneously. The design balances the need to keep velocities above 2 fps and below 6 fps while, at the same time, keeping the total head in all parts of the system below 200 feet. Due to the accumulated friction losses, sizing all branches to keep velocities over 3.5 fps will drive the maximum total head in the extreme ends of the system higher than an individual pump's capability (approximately 108 psi or 250 feet). Velocities do not drop below 2 fps, the minimum velocity allowed by ADEQ guidelines. Since individual septic tanks are used to collect and hold solids, the system pumps mostly effluent to the treatment plant.

**CERTIFICATION:**

I, Peter S. Jorgensen, hereby certify that I am a Registered Professional Engineer in the State of Arizona, and that this report was prepared under my direction.

  
Peter S. Jorgensen, P.E. 12734



# **APPENDIX A**

## **LOW PRESSURE**

### **SANITARY SEWER SYSTEM**

By: BAL		Date: 21-Jan-00		LOW PRESSURE SEWER SYSTEM						Project: Inscription Canyon Ranch						
Pipe: SDR 21 PVC		PIPE SCHEDULE AND BRANCH ANALYSIS						Unit Four								
Prepared for: Williamson Valley Investors, Ltd.								Dava Proj. No.: 537PAD								
								Sheet No. 1 of 3			Rev.					
1 BRANCH NUMBER	2 NO. OF PUMPS	3 ACCUM. TOTAL	4 MAXIMUM NO. "ON"	5 MAXIMUM FLOW (gpm)	6 PIPE SIZE (in)	7 MAXIMUM VELOCITY (fps)	8 LENGTH (ft)	9 FRICTION LOSS (ft/100 ft)	10 FRICTION LOSS TOTAL (ft)	11 ACCUM. FRICTION LOSS (ft)	12 MAXIMUM MAIN ELEV. (ft)	13 MINIMUM PUMP ELEV. (ft)	14 ELEV. DIFF. (ft)	15 MAXIMUM TOTAL HEAD (ft)	16 VELOCITY ≥ 2 fps	17 TOTAL HEAD ≤ 200 ft
441	3	3	2	22	1 1/2	3.04	575	2.15	12.4	191.3	5080	5110	0	191.3	YES	YES
442	2	2	2	22	1 1/2	3.04	265	2.15	5.7	184.6	5080	5112	0	184.6	YES	YES
443	1	6	3	33	1 1/2	4.56	525	4.56	23.9	178.9	5080	5094	0	178.9	YES	YES
444	5	5	3	33	1 1/2	4.56	270	4.56	12.3	167.3	5080	5096	0	167.3	YES	YES
445	2	13	4	44	2	3.89	340	2.63	8.9	155.0	5080	5092	0	155.0	YES	YES
446	3	3	2	22	1 1/2	3.04	175	2.15	3.8	149.8	5080	5094	0	149.8	YES	YES
447	1	17	4	44	2	3.89	235	2.63	6.2	146.0	5080	5092	0	146.0	YES	YES
448	9	9	3	33	1 1/2	4.56	1130	4.56	51.5	191.4	5080	5088	0	191.4	YES	YES
449	3	29	5	55	2	4.87	555	3.97	22.0	139.9	5080	5078	2	141.9	YES	YES
450	6	6	3	33	1 1/2	4.56	420	4.56	19.2	165.4	5080	5088	0	165.4	YES	YES
451	12	18	4	44	2	3.89	1080	2.63	28.4	146.2	5080	5075	5	151.2	YES	YES
453	2	58	7	77	2 1/2	4.65	650	2.93	19.0	117.8	5080	5074	6	123.8	YES	YES
452	9	9	3	33	1 1/2	4.56	820	4.56	37.4	155.2	5080	5060	20	175.2	YES	YES
454	5	5	3	33	1 1/2	4.56	445	4.56	20.3	162.5	5080	5092	0	162.5	YES	YES
455	5	5	3	33	1 1/2	4.56	490	4.56	22.3	164.5	5080	5082	0	164.5	YES	YES
456	6	16	4	44	2	3.89	640	2.63	16.8	142.2	5080	5078	2	144.2	YES	YES

By: BAL		Date: 21-Jan-00		LOW PRESSURE SEWER SYSTEM PIPE SCHEDULE AND BRANCH ANALYSIS						Project: Inscription Canyon Ranch Unit Four						
Pipe: SDR 21 PVC		Prepared for: Williamson Valley Investors, Ltd.								Dava Proj. No.: 537PAD				Sheet No. 2 of 3 Rev.		
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457	7	7	3	33	1 1/2	4.56	605	4.56	27.6	153.0	5080	5078	2	155.0	YES	YES
458	6	29	5	55	2	4.87	670	3.97	26.6	125.4	5080	5062	18	143.4	YES	YES
459	5	92	8	88	2 1/2	5.32	765	3.75	28.7	98.8	5080	5068	12	110.8	YES	YES
460	7	7	3	33	1 1/2	4.56	860	4.56	39.2	109.3	5080	5080	0	109.3	YES	YES
461	3	102	8	88	2 1/2	5.32	640	3.75	24.0	70.1	5080	5058	22	92.1	YES	YES
462	4	4	3	33	1 1/2	4.56	340	4.56	15.5	126.5	5096	5070	26	152.5	YES	YES
463	66	70	7	77	2 1/2	4.65	990	2.93	29.0	140.0	5100	5080	20	160.0	YES	YES
464	6	76	7	77	2 1/2	4.65	820	2.93	24.0	111.0	5090	5084	6	117.0	YES	YES
465	9	9	3	33	1 1/2	4.56	650	4.56	29.6	116.6	5090	5060	30	146.6	YES	YES
466	10	95	8	88	2 1/2	5.32	1090	3.75	40.9	87.0	5080	5070	10	97.0	YES	YES
467	3	200	11	121	3	4.93	630	2.6	16.4	46.1	5080	5060	20	66.1	YES	YES

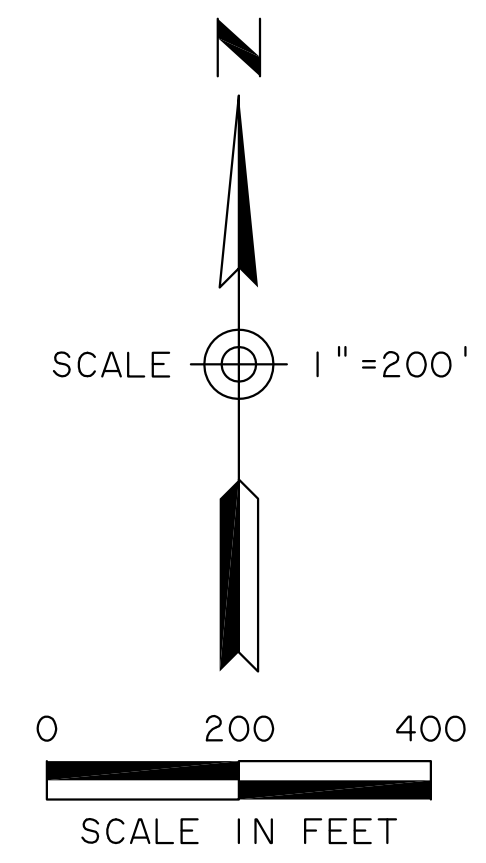
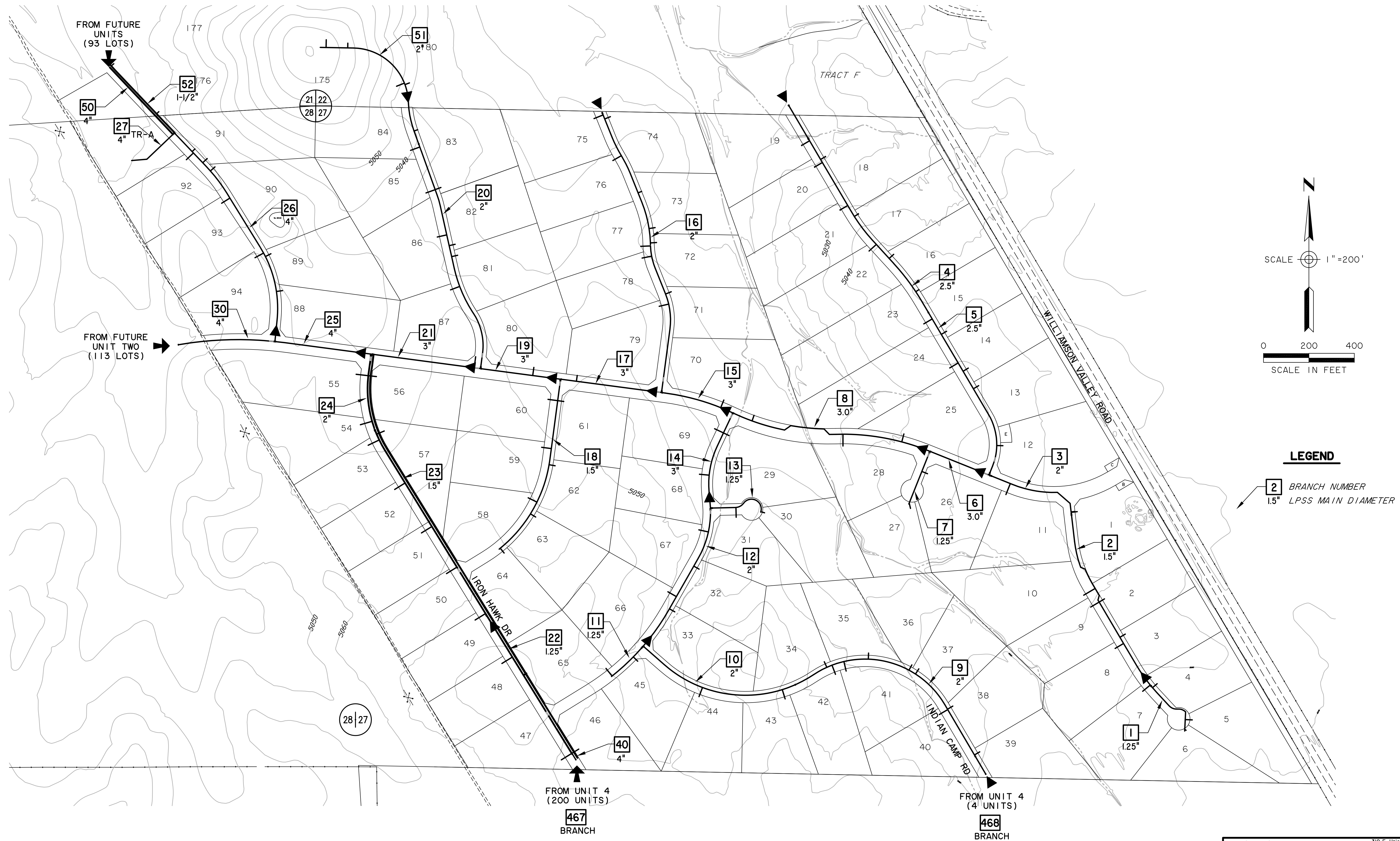
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U1-40	0	200	11	121	4	2.98	2100	0.76	16.0	46.1	5080	5060	20	66.1	YES	YES
U1-25	0	295	14	154	4	3.8	430	1.19	5.1	30.1	5032	5032	0	30.1	YES	YES
U1-26	7	415	18	198	4	4.88	1050	1.9	20.0	25.0	5002	5006	0	25.0	YES	YES
U1-27	0	510	21	231	4	5.69	200	2.53	5.1	5.1	5002	5002	0	5.1	YES	YES
U1-9	9	13	4	44	2	3.89	1090	2.63	28.7	134.1	5056	5032	24	158.1	YES	YES
U1-10	2	15	4	44	2	3.89	750	2.63	19.7	105.5	5048	5048	0	105.5	YES	YES
U1-12	4	21	5	55	2	4.87	700	3.97	27.8	85.7	5040	5028	12	97.7	YES	YES
U1-14	3	26	5	55	3	2.24	450	0.6	2.7	57.9	5040	5012	28	85.9	YES	YES
U1-15	1	55	7	77	3	3.14	350	1.12	3.9	55.2	5040	5040	0	55.2	YES	YES
U1-17	0	64	7	77	3	3.14	900	1.12	10.1	51.3	5040	5040	0	51.3	YES	YES
U1-19	1	72	7	77	3	3.14	350	1.12	3.9	41.2	5040	5028	12	53.2	YES	YES
U1-21	0	83	8	88	3	3.59	500	1.44	7.2	37.3	5032	5032	0	37.3	YES	YES



# INSCRIPTION CANYON RANCH - UNIT ONE and THREE

## LOW PRESSURE SEWER SYSTEM (LPSS)

### BRANCH CONNECTIONS



**LEGEND**

- 2 BRANCH NUMBER
- 1.5" LPSS MAIN DIAMETER

<b>DAYA</b>		310 E. Union Street Prescott, AZ 86303 920/778-7587 602/253-1734	
PLANNING ENGINEERING SURVEYING		<b>&amp; ASSOCIATES, INC.</b>	
CLIENT:	-	DATE:	1 FEB 2000
JOB:	5371CR	DRAWN BY:	REF
LPSS BRANCH CONNECTIONS	-	SHEET	2 OF 2

EXH-12.DWG

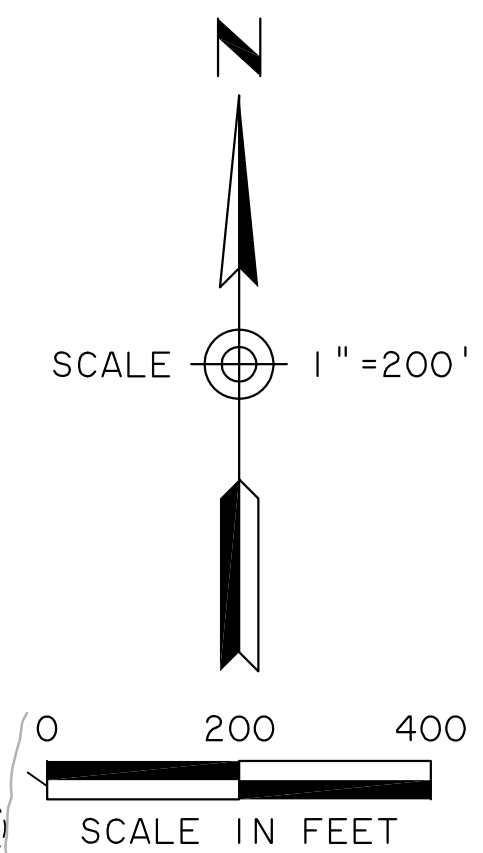
# INSCRIPTION CANYON RANCH - UNIT FOUR

## LOW PRESSURE SEWER SYSTEM (LPSS)

### BRANCH CONNECTIONS

#### LEGEND

- 2 BRANCH NUMBER
- 1.5" LPSS MAIN DIAMETER



FROM FUTURE  
UNIT (61)

<b>DAYA</b> PLANNING ENGINEERING SURVEYING		310 E. Union Street Prescott, AZ 86303 928/778-7587	
<b>&amp; ASSOCIATES, INC.</b>		CLIENT: -	DATE: 10 MAR 03
JOB: 537PAD		DRAWN BY: BAL/GHH	
LPSS BRANCH CONNECTIONS		SHEET 1 of 2	

EXH-008.DWG