

Drainage Reports

Abbreviated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

**Preliminary Drainage Report
For
Bell & Hartford
Near the NEC Bell Road & 82nd Street
Scottsdale, Arizona**

| | |
|--|-------------------|
| Plan # | _____ |
| Case # | <u>27-DR-2018</u> |
| OS # | _____ |
| <input checked="" type="checkbox"/> Accepted | |
| <input type="checkbox"/> Corrections | |
| <u>DG</u> | <u>8/15/2018</u> |
| Reviewed By | Date |

August 2018

Prepared by:
Hunter Engineering, Inc.
10450 N. 74th Street, Suite 200
Scottsdale, AZ 85258

27-DR-2018
8/6/2018

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Scottsdale, AZ 85258

PRELIMINARY DRAINAGE REPORT
FOR
BELL & HARTFORD
Near the **NEC BELL ROAD & 82nd STREET**
SCOTTSDALE, ARIZONA

PREPARED FOR

LGE CORPORATION
740 NORTH 52ND STREET
PHOENIX, AZ 85008

27-DR-2018

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H.E. PROJECT NO. LGEC249

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|-----------------|---|-----------------|
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1. Introduction

1.1. Project Description

This Preliminary Drainage Report has been prepared under contract with LGE Corporation, developer of the Bell & Hartford project. The purpose of this report is to provide a preliminary drainage analysis as required by the City of Scottsdale to support this development. This report has been prepared according to the procedures detailed in the *City of Scottsdale Design Standards & Policies Manual*. (Reference 1) and the *Drainage Design Manual for Maricopa County, Arizona, Volume I & II, Hydrology and Hydraulics*", (References 2 & 3).

1.1.1. Project Name & Address

The project is located east of the northeast corner of Bell Road and 82nd Street, within the City of Scottsdale, Maricopa County, Arizona. The parcel is bound by East Hartford Drive to the north, by an existing development to the east, by Bell Road to the south, and by existing developments to the west. There is an existing drainage channel enveloped by a drainage easement along the east and south sides of the site. The site is specifically located within the southwest quarter of Section 36, Township 4 North, Range 4 East, of the Gila and Salt River Base and Meridian. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system.

1.1.2. Location & Topography

The north half of the site consists of an existing asphalt parking lot. It drains primarily to the south at an average slope of 1 to 2 percent. Prior to 2006 the south half of the site was an asphalt parking lot as well. The southerly parking lot has since been removed.

1.1.3. Purpose

The purpose of this drainage report is to comply with City of Scottsdale and Maricopa County Flood Control District requirements and regulations. This report provides the necessary analysis and evaluates the potential drainage impacts to the existing site and surrounding properties as a result of this development.

1.1.4. Regional Drainage Plan

Currently, there is a Regional Drainage Plan for the site and surrounding development named Scottsdale Perimeter Center. Retention for the 100-year, 2-hour storm has been provided and is stored within the Tournament Players Club Golf Course. See the Master Drainage Report for Scottsdale Perimeter Center prepared by Collar, William & White Engineering and accepted by the city April 12, 1989. Excerpts from this report can be found in Appendix B.

1.1.5. Site Location Relative to Known FEMA Flood Hazard Zones

The current FEMA Flood Insurance Rate Map (FIRM) for this area, map number 04013C1320 L (Revision date October 16, 2013) shows the entire project site is in a flood hazard Shaded Zone AO. Shaded Zone AO is defined as, "*Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.*" The flood depth specified by FEMA for this area is 1 foot with velocities of 3 fps.

2. Hydrologic Analysis

The preliminary proposed drainage concept is presented in three parts: off-site hydrology, on-site hydrology and proposed drainage infrastructure, Sections 2.1, and 2.2. Exhibit A, located in the back pocket, provides a graphical illustration of the proposed drainage concept.

2.1. Off-Site Hydrology

2.1.1. Impacts to Proposed Project Site

The Master Drainage Report for the Scottsdale Perimeter Center, including the subject site, was prepared by Collar, William & White Engineering. This report identifies the expected off-site flows for the overall development. Currently all the infrastructure surrounding the site has been constructed. This includes roadways to the north and south, and grass lined channels along the east and south sides. The channels are enveloped by Drainage Easements and none of the proposed improvements encroach upon these easements or significantly change the channels.

2.1.2. Existing Land Use

Currently, the south half the site is undeveloped and is unused. An existing parking lot resides on the north side of the site but has not been maintained. It does not appear to have been utilized recently. This project includes the removal of the existing paving and placing new pavement.

2.2. On-Site Hydrology

2.2.1. Methodology and Criteria

The On-Site Hydrology and conveyance will be in accordance with the City of Scottsdale Design Standards & Policy Manual (Reference 1) and the FCDMC Drainage Design Manuals Volumes I-II (Reference 2&3).

3. Proposed Drainage Infrastructure

3.1. Conveyance of Runoff Offsite

On-site runoff will be directed via overland flow and gutters, to catch basins and stormdrain. The offsite flow along the existing drainage channel will remain, no changes are proposed to the existing channel conveyance. On-site stormwater will be added to the offsite channel flow as outlined in the Master Drainage Report for the Scottsdale Perimeter Center. The drainage channel along the south and east side of the site drain to the existing box culvert under Bell Avenue as they have done historically. This project does not direct any additional stormwater to the existing grass lined channel than previously planned and approved.

3.2. Onsite Retention Requirements

3.2.1. Required Retention Volume

No on-site retention is provided. The required retention is provided by the T.P.C Golf Course per the Regional Drainage Plan for the development named Scottsdale Perimeter Center.

4. Special Issues or Considerations

4.1. 401/404 Permit

There are no existing natural drainage channels onsite and no washes classified as section 404 jurisdictional waters. However, the US Army Corps of Engineers has advised that the existing manmade grass lined channels have been delineated as waters of the US. No changes are proposed to the aforementioned grass lined channel.

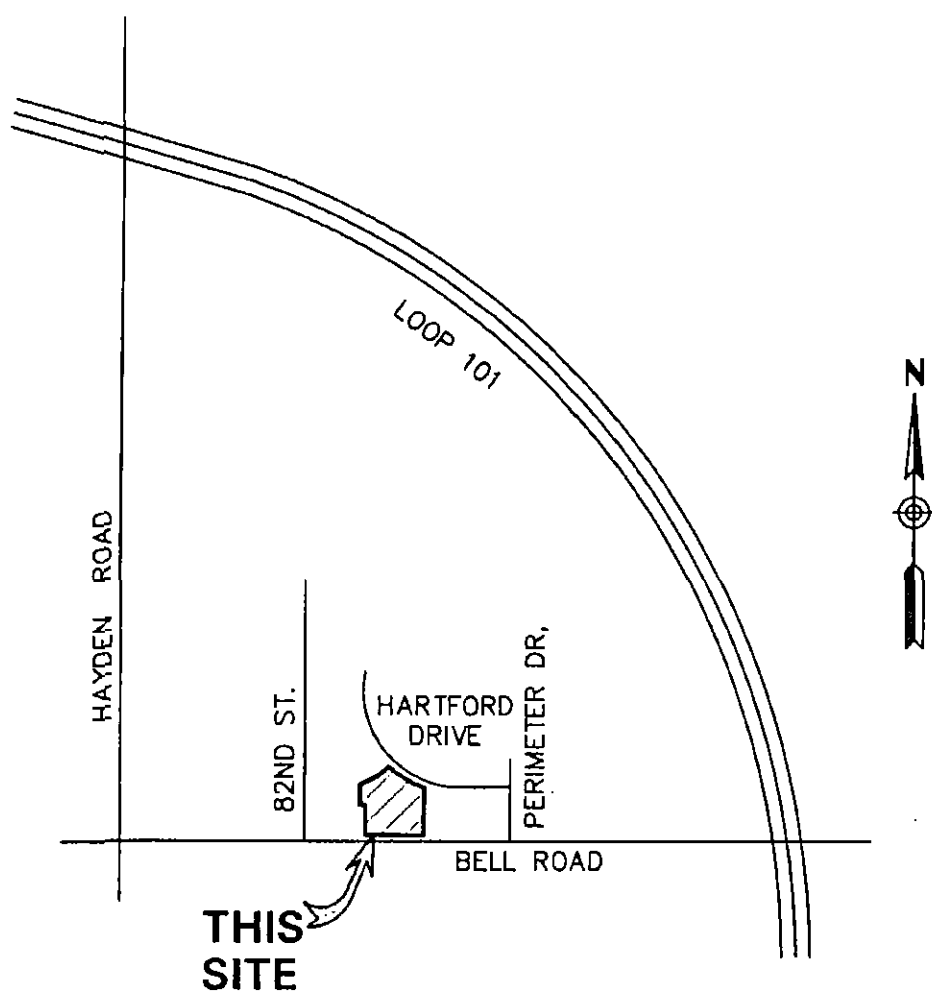
4.2. Floodplain Use Permit with FCDMC

Since this project proposes a building within the flood hazard zone, a Floodplain Use Permit will be applied for with the Flood Control District of Maricopa County.

4.3. Determination of Finish Floor Elevation

The proposed building finish floor elevation was determined in accordance with the City of Scottsdale and FEMA requirements. The current FEMA Flood Insurance Rate Map (FIRM) for this area, map number 04013C1320 L (Revision date October 16, 2013) shows the entire site is subject to a 100-year flood depth of 1-foot and velocity of 3-fps. A recent topographic survey was performed by Hunter Engineering and has been compared to the topography shown on the initial development plans from 1984, labeled, "Grading and Drainage Plans for Scottsdale Perimeter Center Phase Two". The two surveys appear to show roughly the same grades within the proposed building footprint. The highest existing natural grade within the proposed building footprint was found to be 1551.26.

This elevation was also compared to the City of Scottsdale Contour Quarter Section Map, which shows the highest existing elevation within the building footprint is approximately 1551.00. A finish floor elevation of 1553.30 is proposed to allow for a minimum of 1-foot of flood depth and 1-foot of freeboard. This elevation is more than



VICINITY MAP
FIGURE 1

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, AV, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of shallow fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently dismantled. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE AV** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 1% annual chance flood.


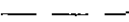
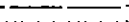


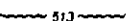
OTHER AREAS

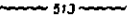
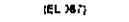
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

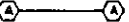
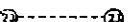

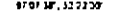
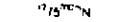


OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

-  1% annual chance floodplain boundary
-  0.2% annual chance floodplain boundary
-  Floodway boundary
-  Zone D boundary
-  CBRS and OPA boundary
-  Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

-  Base Flood Elevation line and arrow; elevation in feet*
-  Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

-  Cross section line
-  Intersect line
-  Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
-  1000 meter Universal Transverse Mercator grid lines, zone 12
-  5000 foot grid lines; Arizona State Plane coordinate system, coastal zone (FIPS ZONE 0282), Transverse Mercator
-  Benchmark mark (see explanation in Access to Users section of the FIRMP panel)
-  River Mile

MAP REPOSITORIES

Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTY WIDE FLOOD INSURANCE RATE MAP
 April 15, 1988

EFFECTIVE DATES OF REVISIONS TO THIS PANEL

December 3, 1993 - September 30, 1995 July 13, 2011 - September 10, 2005
 October 16, 2013 - to add panel flood elevations, to add special flood hazard areas, to incorporate previously issued letters of map revision, to add roads and road names, to update corporate limits, to change roadway to advance suffix, to change base flood elevations and to add floodway

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6670

MAP LEGEND

PANEL 1320L

FIRM
 FLOOD INSURANCE RATE MAP
 MARICOPA COUNTY,
 ARIZONA
 AND INCORPORATED AREAS

PANEL 1320 OF 4425
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|--------------------|--------|-------|--------|
| MARICOPA COUNTY | 04037 | 1320 | L |
| MUSKOGEE CITY OF | 04031 | 1320 | L |
| SCOTTSDALE CITY OF | 04012 | 1320 | L |

Notes to User: The Map Number shown below should be used when placing map orders. The Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
 04013C1320L
 MAP REVISED
 OCTOBER 16, 2013

Federal Emergency Management Agency

FIRM PANEL



PORTION OF PANEL SHOWING SITE
FIGURE 2

National Flood Hazard Layer FIRMette



33°38'43.83"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000 33°38'13.87"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

| | | |
|------------------------------------|--|---|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE) Zone A, V, APB |
| | | With BFE or Depth |
| | | Regulatory Floodway, Zone AL, AD, AV, VE, AP |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone Z |
| | | Future Conditions 1% Annual Chance Flood Hazard Zone F |
| | | Area with Reduced Flood Risk due to Levee. See Notes, Zone A |
| | | Area with Flood Risk due to Levee Zone D |
| OTHER AREAS | | Area of Minimal Flood Hazard Zone X |
| | | Effective LOMRs |
| | | Area of Undetermined Flood Hazard Zone D |
| GENERAL STRUCTURES | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |
| OTHER FEATURES | | 29.2 17.6 Cross Sections with 1% Annual Chance Water Surface Elevation |
| | | Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| | | Coastal Transect Baseline |
| | | Profile Baseline |
| | | Hydrographic Feature |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The base map shown complies with FEMA's base map accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/6/2018 at 11:17:22 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: base map imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

38-47

37-46

37-45

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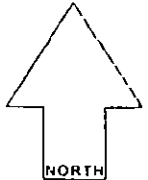


36-47

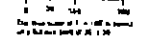
WARNING: NOT TO BE USED FOR CONSTRUCTION PURPOSES
 This map is a reproduction of a map prepared by the U.S. Army Corps of Engineers, and is not a survey. It is not to be used for construction purposes. It is not to be used for any other purpose without the express written consent of the U.S. Army Corps of Engineers.

LEGEND:

VICINITY MAP



SCALE 1" = 100'



CONTOUR QUARTER SECTION MAP

37-47
S27 1/4 SEC 36 T4N R4E

16 SLOTTED GEOGRAPHIC INFORMATION SYSTEMS
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1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000.

APPENDIX B
EXCERPTS FROM SCOTTSDALE PERIMETER CENTER MASTER
DRAINAGE REPORT