APPENDIX 10
WATER SYSTEM PLAN
Preliminary Water System Plan

A “Water System Evaluation Report” was prepared for Entezar Development and Spanish Castle Resort by Western Pacific Engineering & Survey, Inc. Completed in June 2007, this report was based on the phasing plan established in the MPR document and identified appropriate build-out design as required for the final phase of the development. A conceptual lot layout and looped water system network was also developed (see Plate No.: 3 in the WPE report), along with related pump data, design references, flow calculations, demand tables, use estimates and specific design details for storage tanks and main loop distribution pressure reducing valves for use within Spanish Castle Resort.

This section of the MPR provides a framework for incremental water system design, installation and service for the Spanish Castle Resort development consistent with the needs previously identified in the phasing section. The 2007 Water System Evaluation Report may require an update to account for new information and/or new design standards.

Water System for Phased Build-Out

Initial homes (up to 15 lots) will be served by a Group B Water System. Once that threshold is reached, a Group A Water System Plan will be developed to serve the resort. The Spanish Castle Resort Water System will be developed in phases that anticipate and contribute to final build-out conditions. This plan will include the following components:

- **Initial Subdivision(s).**
  
  **A.** Homes in Spanish Castle Resort are anticipated to be secondary vacation homes to a large degree. However, during peak season periods, the resort will most likely see higher occupancy rates. To maintain a conservative use impact analysis, the water system analysis will also consider conditions with the recreational homes 80% occupied.

  **B.** Estimated water system demand was previously based upon the wastewater flow per unit with a 25% increase. As noted in Washington State Department of Health Water System Design Manual, 2009:

  - “The pre-1986 sizing guideline of 800 gallons per day (gpd)/connection for MDD in Western Washington and 1,500 gpd/connection for MDD in Eastern Washington

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was inadequate for some water systems' source and storage facilities. In a few isolated cases in Western Washington, the MDD has been as high as 2,000 gpd/ connection. In Eastern Washington, the MDD for some water systems has been as high as 8,000 gpd/ connection. Design engineers should recognize that some water systems are outside the norm and will have much greater water demand”.

And further in the manual:

- "Engineers should quantify the following water-demand parameters by using actual water use records, water use from an analogous water system, or the sizing criteria in [DOH] Appendix D, as applicable:
  - MDD (residential) in gpd/residential connection
  - ADD (residential) in gpd/residential connection
  - PHD(residential) in gpm for the water system’s residential service population
  - MDD(nonresidential) in gpd/nonresidential connection
  - ADD(nonresidential) in gpd/nonresidential connection
  - PHD(nonresidential) in gpm for the water system’s nonresidential service population. “

Based upon the revisions in phasing this development, Washington State Department of Health updated Water System Design Manual (2009), and contemporary demand and actual-record use information for the adjacent area in conjunction with new well data and other design assumptions, new analysis and calculations will likely indicate a reduced PHD that will affect the incremental phased design of the water distribution system.

C. Homes in this phase will be detached, single family with a maximum 3,500 GSF limit.

D. Fire flow for this phase will be determined by the International Fire Code requirements of 1,500 GPM for two hours with a residual PSI of 20, per DCC 15.28.090.

E. Regular maintenance and annual compliance for the water system will be handled through contract with an approved vendor and administered under a Spanish Castle Resort-wide association.

- Additional Subdivision(s).

A. Expand service with loop(s) that equalize pressure and augment service and required storage capacities.

B. Homes in this phase will be detached, single family with a maximum 3,500 GSF limit.

C. Fire flow for this phase will be determined by the International Fire code requirements of 1,500 GPM for two hours with a residual PSI of 20, per DCC 15.28.090.

D. Regular maintenance and annual compliance for the water system will be handled through contract with an approved vendor and administered under a Spanish Castle Resort-wide association.
E. Fire flow storage and delivery to the fire hydrants for additional subdivisions may be coordinated with the Group A water system planned to serve the resort at build-out. Fire flow shall not be combined with the proposed Group B water system planned to serve the initial phase of development.

F. Fire hydrants located at the resort will be private and shall be designed to comply with National Fire Protection Association Standard 24. Installation of underground water mains, hydrants, and fire sprinkler connections shall comply with IFC 507.2, NFPA 24, and RCW 18.160.

- Water System Crossings of County Right-of-Way and BNSF Property

Water system utility crossings of county right-of-way will be minimized, keeping the majority of the system outside the County right-of-way. The water system will be located within the Vulcan Siding Road right-of-way and cross Spanish Castle Road at the intersection of the two roads. A crossing will also be provided to bring irrigation water to the median near SR 28. A Franchise Agreement with Douglas County will be required to provide for maintenance of the water system constructed within County right-of-way. See Figure A10.1.

Water system utility crossings within BNSF property will be co-located with roadway crossings if possible. An agreement will be necessary with BNSF to provide for the construction and on-going maintenance of these utilities in accordance with the BNSF Railway Utility Accommodation Policy.
Figure A10.1. Water System Utility Crossing Locations