

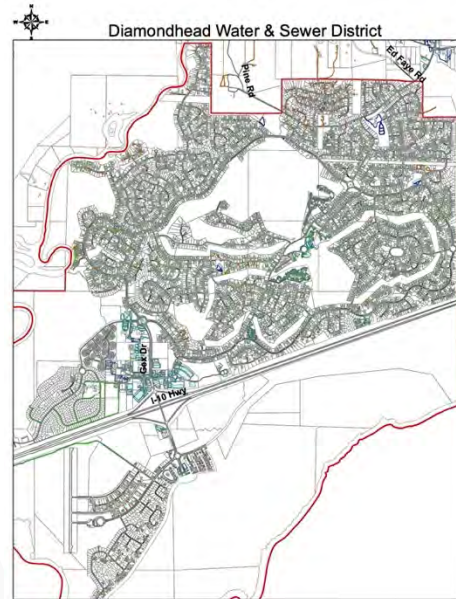
## DWSD Blog Series #3 - Pure, Clean, Healthy Drinking Water Delivery & Sewage Removal & Treatment, How is it Done? Your District's Water & Sanitary Sewer System 101

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Building on the infrastructure development history released in Post #2, Post #3 will focus on how this complex arterial system is leveraged to provide the water and sewer services most of us largely take for granted.

The incorporated service boundaries of Diamondhead comprise approximately 8.9 square miles of land area. Currently, the District services the daily residential and commercial demands of this expansive area with approximately 89 miles of water lines and just over 90 miles of active sewer lines.

The District's centralized system is actually comprised of three separable, yet highly integrated services: (1) drinking water; (2) wastewater collection; and, (3) wastewater treatment and disposal. It should be pointed out that our District is unique across the 3 coast counties as it is the only singularly integrated district that provides all three of these services through one provider. Both Bay St. Louis and Waveland must rely on the Hancock County Utility Authority for wastewater treatment on a volume of use fee basis. Similarly, Pass Christian, Long Beach, Gulfport, and Biloxi must rely on the Harrison County Utility Authority, and Ocean Springs, Moss Point, and Pascagoula must rely on the Jackson County Utility Authority for their wastewater treatment on a volume of use fee basis. In contrast, Diamondhead's centralized and fully integrated system provides residents, and the commercial community with the most agile and cost-effective service framework on the coast.



### Drinking Water

As many of us have come to know from our friends and family members living outside of our District, Diamondhead's water purity, color and clarity, and taste is the Gold Standard others are perpetually striving to achieve. The Founding Developer likely could not have forecast just how strategic his choice of this land tract would prove to be in providing residents with the superior quality drinking water we enjoy. Our unique geography affords us access to a superior deep drinking water aquifer. Pulling that water into our system is accomplished with the help of 4 very large, and very deep (up to over 1900 ft.) natural water wells.



These 4 wells operate around the clock on a rotating demand system and ramp up as demand increases. Collectively they are able to pump over 6,000 gallons per minute if demanded. In recent years, they have been modernized with new energy efficient pumps and control systems saving our customers 20-30% in operating costs. These critical well stations are monitored 24 hours a day and are integrated with Chlorine and Fluoride injector systems for tightly regulated disinfection and metered health dosages.

These 4 wells supply water to both the lines to your meter as well as the District's 500,000-gallon water tower located at the intersection of Diamondhead Drive West and Golf Club. This tower was engineered to bring stable pressure and volume to every resident's tap. It also provides the necessary hydraulic volume and pressure required for all of our Community's current fire hydrants, and commercial sprinkler fire suppression systems. While this tower has served our demands extremely well it has maxed out its capacity. Consequently, we will be building a sister Tower in the near future to ensure that our fire hydrants continue to pass certification and to meet the rapid commercial and residential growth ongoing and planned in the Envision 2040 Plan.



The greatest vulnerability to our water service stems from the vast majority of the water mains being comprised of “thin wall” PVC (Poly Vinyl Chloride) pipe that are mostly 50 years old. Consequent to their age, and construction quality, these existing thin PVC pipe water mains are rupturing in increasingly greater frequency. Repairs and replacements are performed with the use of more modern piping which consists of C900 heavy wall PVC pipe with pressure ratings of 260 psi. Additionally, water service lines are made of CTS (Copper Tubing Size) polyethylene tubing. The service line

tubing which was originally installed in the 70's and 80's is much thinner than poly tubing used today. As with the PVC water mains, the service tubing suffers failures on a regular basis. Approximately, 3 to 5 service lines are repaired on an emergency basis each week. The highly trained and very experienced District personnel utilize the best, most cost-effective methods and techniques available to perform repairs efficiently and quickly. The ultimate solution to these problems is to replace all of the old piping. Unfortunately, at a scale of 90 miles of pipe, that is both spatially and financially infeasible to do all at once. Therefore, the District continually assesses these water lines based on several key factors to risk rank and determine which ones will be rehabilitated within each sequential 5-year Capital Improvement Plan.

As you can see, there are innumerable threats that have to be safeguarded against every day to ensure our customers are getting pure, clean and safe drinking water from their tap every time they demand it. Behind the scenes, the warriors combating these challenges on your behalf are the District's

highly trained and state certified water operators who steadily monitor, and maintain the water system 24 hours/day. Coupled with certified lab analysts who test the water at the source wells 7 days a week, and the rapid response technical maintenance and repair personnel that virtually never fail to repair breaches or breakdowns within the same service day, you can sleep comfortably knowing that your drinking water service is the cleanest, safest, and most reliable available.



### Sanitary Sewer Collection System

The District's Sanitary Sewage is collected through the 90-mile-long sanitary collection system piping which runs along every street and includes interconnections from street to street along easements of undeveloped areas. This system does not collect or process stormwater. Inadvertently, storm water only enters the system through I & I (inflow and infiltration) caused by leaking pipe joints or breaks within the pipe. The District inspects the collection system using high tech video inspection equipment, high pressure hydro-jetting equipment and vacuum truck to identify failures within the piping and prioritize repairs or replacements as needed. The District's I & I (inflow & Infiltration) Dept. Supervisor and the General Manager of the District are two of a handful of nationally certified operators in the State of Mississippi with certifications through NASSCO (National Association of Sewer Service Companies) in PACP (Pipeline Assessment Certification Program), LACP (Lateral Assessment Certification Program) and MACP (Manhole Assessment Certification Program) who assess and evaluate projects for sewer system improvements throughout the District. The District's Utilities Maintenance Dept. personnel perform sewer repairs frequently to sewer service laterals and sewer mains. Sewer main re-lining and replacement projects are planned annually in order to improve the system and reduce inflow and infiltration. Approximately 80% of the sewer collection system is comprised VCP (Vitreous Clay Pipe) and the vast majority is 8-inch diameter. The remaining 20% is made up of PVC (Poly Vinyl Chloride). Approximately 20% of the clay pipe has been "re-lined", point repairs performed and small segments replaced with PVC pipe. All gravity sewer mains flow to one of the 35 sewer lift stations (also known as pumping stations) throughout the city. Each sewer lift station has a basin assigned to that particular lift station. For example, basin #13 consists of all sewer piping which flows into sewer lift station #13. From the various lift stations, sewage is pumped in a "leap frog" fashion to other lift stations until it ends up at the wastewater treatment plant. Five of the existing sewer lift stations are considered "terminal lift stations" which means they pump sewage directly to the wastewater treatment plant.

## Wastewater Treatment and Disposal

The District owns and operates the Utility's 8 MGD (million gallons per day) wastewater treatment plant. This facility receives all of Diamondhead's sewage through a "headworks facility". This portion of the wastewater treatment facility processes the influent wastewater and separates plastics, large debris, etc. via an automatic "bar screen". Two grit chambers separate any "grit" from the water as it is pumped into the two 1,000,000-gallon digester tanks where it is aerated as it continues through the treatment process. From this stage to the last stage of treatment, a series of testing is performed within the plant laboratory facility by highly trained wastewater operator/lab technician. These tests are performed 7 days per week pursuant to NPDES (National Pollutant Discharge Elimination System) Permit requirements. As the waste sludge is removed from the water, it passes through an onsite "belt press" and the nearly dried sludge is placed into



a 30-cubic yard hauler. This material is transported by permit to various "land applications" by an independent company. The wastewater continues through the treatment process into the "clarifier tanks". Final separation of any residual suspended material occurs and the remaining water enter the UV (ultraviolet) light process. The final stage of wastewater treatment is the effluent chamber where it is pumped to its permitted discharge location into the Jourdan River via a 30-inch diameter HDPE (High Density Polyethylene) effluent pipe.



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In closing this Post, we want to sincerely thank you for taking the time to get better acquainted with exactly how complex and technically involved the process actually is to provide safe water to, and the subsequent removal and disposal of sewage from your home and/or business. We're confident that the more informed we all become as to what it actually takes to operate and manage these vital services the better positioned, we will be to cast a responsible vote on the June 8<sup>th</sup> Referendum. Please continue to follow the remaining information Posts #4-8 in the coming weeks.

The Diamondhead Water and Sewer Board