GRIFFIN

THE DRAWDOWN

May 2022

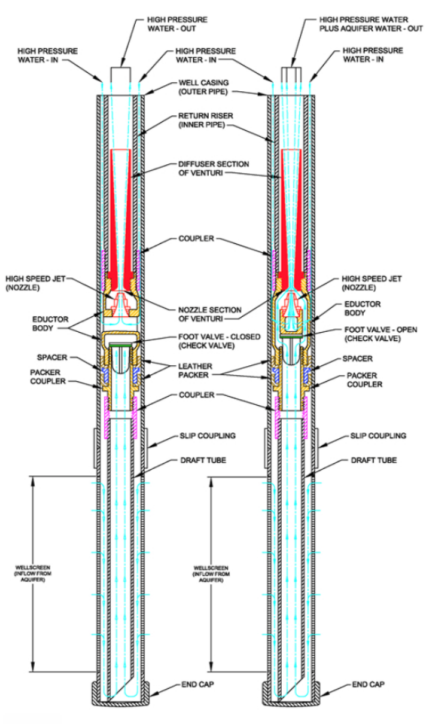
In the last issue of *The Drawdown* we provided a basic overview of construction dewatering; why the process is important and a brief description of different dewatering systems. One of the methods we discussed was eductor dewatering.

Now it's time to "get into the weeds" regarding eductor systems.

What is Eductor Dewatering?

The eductor dewatering method features a series of small diameter wells equipped with a nozzle/venturi (eductor body) that is run by an at-grade pumping station. Eductor wells are extremely low-maintenance and cost-effective as they have no moving parts down-hole and require minimal tuning/maintenance after the initial startup.

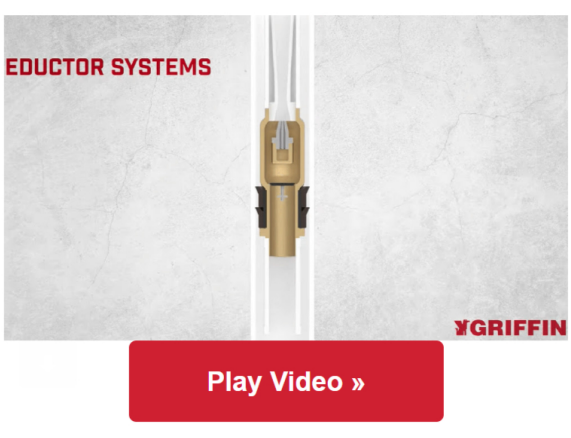
Eductor methods are frequently used with low permeability soils, generally with a total system pumping rate less than 200 GPM. The approach is especially suited for deep excavations as eductors have no suction lift limitations.



Eductor System Design

Eductors are a mix between deep wells and wellpoints and share some advantages and limitations of each system. Eductors typically are closely spaced (5'–15' typical spacing), small diameter wells.

- Each well is equipped with an eductor body (nozzle/venturi setup) near the bottom
- Installed to depths ranging from 20ft to 80+ ft depending on the project/site geology
- Requires a supply & return piping system and high-pressure jet pump to deliver supply water
- Multiple eductors can be powered by a single pump



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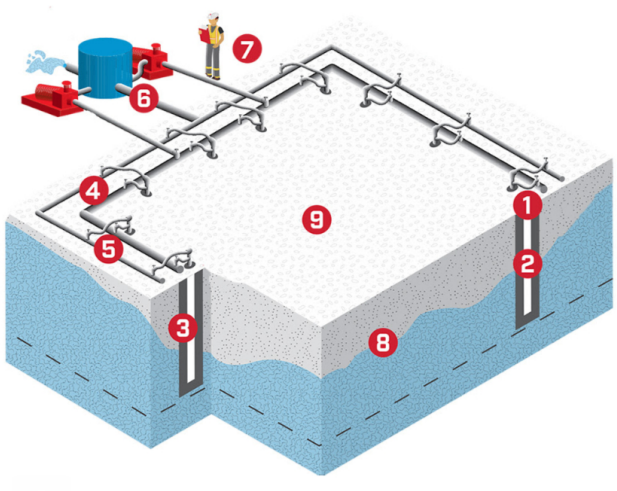
Eductor System Installation Process



1. Jet/drill boreholes at the spacing designed for excavation
2. Install eductor well screen/casing into boreholes
3. Place filter pack & annular seal
4. Develop the eductor well
5. Install pressure & return pipes and eductor bodies
6. Connect eductors to pressure and return pipes w/ high-pressure hoses
7. Set the eductor pump station and tank
8. Optimize, monitor, & adjust system psi
9. Lower the water table
10. Excavate

Eductor Advantages & Limitations

Advantages

- Useful in low permeability soils where close well spacing is required or, vacuum is beneficial
- Low maintenance/tuning required once the system is optimized
- Not limited by suction lift – suited for deep excavations
- Useful for dewatering stratified soils due to vacuum created in the borehole
- Ground elevation installation eliminates the need to install from a sub-cut bench
- Eductors can run dry without groundwater in the well

Limitations

- Volume limited, not suited for high volume applications
- More labor-intensive due to dual supply/return line & other piping/valving
- Pump stations can have higher power requirements
- Eductors can plug or foul if the iron/manganese levels are high in the groundwater. The aeration of the water precipitates the iron plugging up the system. Routine pulling of the eductor heads, cleaning the nozzles, and well screens are needed to make the system operate again as designed.

Visit our blog to learn more about dewatering systems.

View Dewatering Blog »

Griffin Project - Eductor Method

Griffin was contracted for the design and installation of a complex dewatering solution to minimize settlement risk to structures surrounding a 60' deep excavation in downtown Atlanta.

The Challenge

The project required a deep excavation of over 30' below the groundwater table. The site was an entire city block and was bordered by a 100-year-old church and an underground train station. A slow, controlled groundwater drawdown and limited movement of native material was necessary to minimize risk of settlement.

The Solution

Griffin designed and installed a 1,700 LF eductor system around the perimeter of the excavation. Groundwater modeling was used to project drawdown beneath adjacent structures and the model was updated with data from external groundwater monitoring points throughout the project. The eductor system was continually adjusted to maintain water levels just below subgrade to minimize impact on the adjacent structures.

The Griffin Difference

Griffin worked closely with the owner's geotechnical consultant to monitor water levels during the drawdown period. This information was used to update the groundwater and settlement models and provided the information needed to adjust the system throughout the project to mitigate the risk of excessive settlement.

The system-maintained drawdown for over one year to allow for the substantial amount of underground work that was necessary.

View Projects »

Stay tuned for the next issue of *The Drawdown*, that will cover important dewatering issues including water treatment and water discharge permits.

Connect with an expert or visit our website to learn how Griffin's services keep your project safe, stable, and on time.

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