

# Construction Specification 12—Relief Wells

## **1. Scope**

The work consists of installing and developing pressure relief wells in foundations of earth structures.

## **2. Material**

The well screen shall be of the specified type and size, and the size and pattern of the screen openings shall conform to the details shown on the drawings. Each screen shall be equipped with a bottom plug of the same material as the screen.

The riser pipe and fittings shall conform to the requirements of Material Specifications 547, 551, and 554 for the type of pipe specified in section 13 of this specification. Filter material shall conform to the requirements of Material Specification 521 and shall be graded as specified in section 13 of this specification.

## **3. Location and depth of wells**

The plan location and depth of each well shown on the drawings are based on design estimates. The final depth and location of the components of each well will be determined by the engineer on the basis of the examination of the well log and samples recovered during drilling. The location of a well will be changed by the engineer where obstructions encountered during drilling require abandonment of the proposed well location.

## **4. Drilling**

Unless otherwise specified, the wells shall be drilled vertically by a rotary drilling procedure. The diameter of each well shall be adequate to permit the placement of the specified thickness of filter material. As determined by the engineer, drilling methods that may reduce the yield of the well will not be permitted. The well shall be cased with a temporary casing of a type that:

- a. Has sufficient thickness to retain its shape and maintain the true section throughout its total depth, and
- b. Is removable in a manner that does not disturb the filter, well screen, or riser pipe.

## **5. Installing riser pipe and screen**

The riser, consisting of the riser pipe, well screens, couplings, and fittings, shall be measured and inspected as it is assembled and placed in the well. Spiders or other centering devices shall be attached to the assembled riser in sufficient numbers to center it within the well and to accurately maintain its position during the placement of the filter material.

Before the riser is placed, filter materials shall be placed at the bottom of the well to the elevation specified by the engineer for the bottom of the well screen. The riser shall be placed in the well in such a manner as to avoid shock and to prevent damage to any of its components. The relief outlet or top of the riser shall be securely maintained at the designated elevation during the placement of the filter material.

## **6. Placing filter/drainfill**

The filter material shall be placed by tremie, or by another method approved by the engineer, to an elevation not less than 1 foot above the top of the highest well screen. At the initial placement operations, the tremie shall rest on the bottom of the well and be filled with filter material. The tremie and the temporary casing shall be raised in increments of not more than 2 feet, allowing the filter material to flow from the bottom of the tremie. The top surface of the filter material in the tremie shall be maintained above the water surface at all times. The top surface of the filter material in the well shall be maintained a minimum of 2 feet above the bottom of the casing as the casing is raised.

## **7. Developing**

Following filter material placement and when specified in section 13 of this specification, the well shall be developed by an approved method. The contractor shall submit a plan for accomplishing the work to the engineer for review before development of the well.

All materials pulled into the screen during development shall be removed. Filter material shall be added to the annular space around the screen as needed to maintain the top of the filter at the specified elevation.

Any well that continues to produce appreciable amounts of fines for 4 hours after development will be abandoned and relocated unless otherwise continued by the engineer.

## **8. Backfilling**

After the well has been developed, the annular space around the riser pipe above the filter material shall be filled with selected moist impervious earthfill or portland cement concrete. Backfill shall be placed in layers not to exceed 12 inches in thickness, and each layer shall be tamped firmly into place. The temporary casing shall be withdrawn in increments as the backfill is placed.

## **9. Abandoned wells**

All abandoned wells shall be plugged as specified in section 13 of this specification. When a well is abandoned after development, the well screen and riser pipe shall be salvaged, if possible.

## **10. Logging and sampling**

The contractor shall conduct drilling operations in a manner that allows the engineer to take representative disturbed soil samples of all materials encountered.

## **11. Measurement**

**Method 1**—The amount of well drilling is measured to the nearest foot of well drilled and cased. Wells abandoned for causes other than the fault of the contractor will be included in the measurement for payment.

The volume of filter material and backfill material is computed to the nearest 0.1 cubic yard from measurements of the vertical well space occupied by each and the outside diameters of the casing and riser. Filter material and backfill material for wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

The amounts of pipe and well screen installed in the riser and outlet assembly are measured to the nearest linear foot at the time the riser is assembled. Pipe and well screen that cannot be salvaged from wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

The couplings and special fittings and appurtenances are counted at the time the riser is assembled. Couplings and special fittings and appurtenances that cannot be salvaged from wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

The time required to develop each well is measured to the nearest half hour. Time required to develop wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

**Method 2**—The amount of well drilling is measured to the nearest foot of well drilled and cased. Wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

The volume of each grading of filter material placed is computed to the nearest 0.1 cubic yard from measurements of the vertical well space occupied by each and the diameters of the casing and riser. Filter in wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

The amounts of pipe, couplings, fittings, appurtenances, and well screen installed in the riser and outlet assembly are measured to the nearest linear foot at the time the riser is assembled. Pipe, couplings, fittings, appurtenances, and well screen that cannot be salvaged from wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

The time required to develop each well is measured to the nearest half hour. Time required to develop wells abandoned for causes not attributed to actions of the contractor will be included in the measurement for payment.

Backfill is not measured.

## **12. Payment**

**Method 1**—Payment for each item of work will constitute full compensation for all labor, equipment, materials, and all other items necessary and incidental to the completion of the work included in the item.

Payment for drilling and casing each size of well is made at the contract unit price for that size of well and will include compensation for drilling, casing, and pulling casing.

Payment for furnishing and placing filter material is made at the contract unit price for that grading of filter material.

Payment for furnishing, placing, and compacting backfill is made at the contract unit price.

Payment for furnishing and installing each type and size of pipe is made at the contract unit price for that type and size of pipe.

Payment for furnishing and installing each type and size of well screen is made at the contract unit price for that type and size of well screen.

Payment for furnishing and installing each coupling is made at the contract unit price for that type and size of coupling.

Payment for each special fitting or appurtenance is made at the contract unit price for that type and size of fitting or appurtenance.

Payment for developing each well is made at the contract unit price for developing that size of well.

**Method 2**—Payment for each item of work will constitute full compensation for all labor, equipment, materials and all other items necessary and incidental to the completion of the work included in the item.

Payment for drilling, casing, and backfilling each size of well is made at the contract unit price for that size of well and includes compensation for drilling, casing, pulling casing, and backfilling.

Payment for furnishing and placing filter material is made at the contract unit price for that grading of filter material.

Payment for furnishing and installing each type and size of pipe complete with all couplings, fittings, and appurtenances (except well screens) is made at the contract unit price for that type and size of pipe.

Payment for furnishing and installing each type and size of well screen is made at the contract unit price for that type and size of well screen.

Payment for developing each well is made at the contract unit price for developing that size of well.

**Method 3**—Measurement is not made. Items of work listed in the bid schedule for installing, operating, and removal of relief wells will be paid for at the contract lump sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

**All methods**—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 13 of this specification.

### **13. Items of work and construction details**