

ITEM 1

EXCAVATION AND BACKFILL

1.0 DESCRIPTION. The Contractor shall, under Item 1, provide all equipment and labor necessary to perform all required excavation and backfill for the various pipe lines, sewers, conduits and structures, and shall dispose of all surplus excavated materials as specified herein, unless specifically included under other items of these specifications. All excavations shall be done to the lines and grades as given in the contract bid documents and plans.

Earth excavation shall include the cutting and removal of pavement; the removal of trees and stumps less than eight (8) inches in diameter measured at a point of four (4) feet above the ground; the removal, handling, re-handling, hauling, filling and disposal of all earth; loose rock, wet or dry, encountered within the limits of the work; all pumping, bailing, and draining; sheeting and shoring; and all backfill and refill with rolling, tamping and compacting where such is required by these specifications.

2.0 SUBMITTALS. When required by SCMSD, the Contractor shall submit gradation and material data sheets for aggregate and geotextiles.

A. Reference Standards.

1. ODOT CMS 712.09 (for geotextiles).
2. ODOT Supplemental Specification 861 (geogrid).

B. Shop Drawings. Where specified with poor subgrade, the Contractor shall submit product and design data for the geotextile/aggregate wrapped “beam” system including:

1. Material data for geotextile.
2. Material data for aggregate to be wrapped.
3. Installation procedure.

C. Calculations. This section is not applicable.

D. Certifications. This section is not applicable.

3.0 MATERIALS. For trench undercut and wrapped aggregate in poor subgrades, only materials approved by SCMSD may be used.

A. Aggregate.

1. Crushed aggregate of No. 1 and No. 2 sizes as specified in Detail Drawing 3A, shall conform to ODOT CMS Item 703.19A, Table 703.01.

2. Project specific details and geotechnical reports may identify other sizes of aggregate and will govern.

B. Geotextiles. Geotextile fabric and geogrid for separation and reinforcement shall meet the above standards.

4.0 EXECUTION. The contractor shall provide all labor, materials, equipment, and tools necessary to excavate in a safe and workmanlike manner in order to meet line and grade necessary for the proposed work. The Contractor shall be held responsible for any loss or damage to excavated materials to be reset or impacts outside of the work/pay limits. Any deficiencies shall be repaired with new materials, so that, when they are replaced, they will be in as good condition as they were before being disturbed. No extra compensation will be allowed for the removal and storage of such materials, the cost of this work shall be included in the unit prices stipulated for various items of this work.

A. Surface Material.

1. The Contractor shall remove all pavements, sidewalks, curbs, gutters, flagstones, crosswalks and other surface materials. Whenever the removal of pavements other than gravel or surface treated types is required, the Contractor shall outline the area to be removed by making saw cuts providing vertical kerfs in straight lines in order to limit breakage.
2. All topsoil shall be properly classified, separated and carefully stored for future use in backfilling, surfacing and repaving, provided such materials are suitable for such use.
 - a. The Contractor shall carefully remove and store, prior to starting the main excavation work, all loam or topsoil which is suitable for subsequent use upon the work.
 - b. Care shall be taken in removing the loam or topsoil to avoid mixing it with the underlying materials.
 - c. The loam or topsoil stored shall be placed in storage piles on the worksite.

B. Earth/Trench Excavation Operations. The Contractor shall clear the surface of the ground as required for the full width and length of the proposed trench or structure excavation. Trenches and pits, in which the sewers, water mains and structures are to be constructed, shall be excavated in open cuts from the original ground surface to such depths and specified widths as will give suitable space for building the pipe lines, conduits or structures they are to contain, for bracing and supporting the walls of the excavation and for pumping and draining.

1. Any materials which, in the opinion of the Engineer, are unsatisfactory for foundations shall be removed and properly disposed of at the Contractor's expense as part of this Item.
2. The length of trench to be opened or the area of the surface to be disturbed at any one time will be limited with regard to both expeditious construction and to convenience and comfort of the public residing in the neighborhood or frequenting

the streets adjacent to the excavation. Traffic control as required shall be in accordance with Item 58.

3. New trenches shall not be opened when open trenches need backfilling or when labor is needed to restore the surfaces of streets to a safe and proper condition. The Engineer may refuse to supply additional lines and grades for new trenches should the Contractor fail to meet the requirements hereinafter specified as to backfilling and resurfacing.
4. In no case shall more than one hundred (100) feet of trench be opened in advance of the completed work.
5. In built-up districts, and in streets where traffic conditions render it necessary, the Contractor shall not store excavated materials from the first fifty (50) feet of the trench, using the balance, when suitable, for immediate backfill; the last fifty (50) feet of the trench being backfilled with suitable materials furnished by the Contractor for this purpose.
6. If, for any reason, the work is stopped on the whole or any part of the excavation, and the same is left open for an unreasonable length of time in advance of the construction of the sewer, water main or structure, the Contractor shall refill such excavation or part thereof and temporarily repave over the same at his own expense, and he shall not again open such excavation or part thereof until he is ready to proceed with the construction of the work.
7. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pits or manhole covers, valve boxes, curb stop boxes, inlets, fire and police call boxes or other utility controls shall be unobstructed and accessible until the work is completed.
8. Gutters shall be kept clear or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed.
9. Excavation of trenches for pipe sewers with concrete cradle or encasement specified or called for on the drawings shall be made to such widths to the elevation of the top of the pipe as shown on the drawings. Should the trench width exceed the allowable width on either side of the pipe, the Contractor shall place such additional concrete to strengthen the pipe as may be required. No payment for concrete used to add structural strength to the pipe because of excessive trench widths will be made under any item. Pay limits are shown in the details and should be considered during the execution of the project.
10. The erosion control plan shall be adhered to as shown. Any variance shall be approved by the Project Engineer or the Resident Representative before any adjustment is made. Specific Erosion controls are listed in the General Notes section of the Contract Drawings. The Ohio EPA Rainwater and Land Development Manual shall be referenced if the erosion control situation is not covered in the Contract Documents.

C. Unauthorized Excavations.

1. All excavations carried outside of the lines, grades or pavement limits given, specified or directed, together with the disposal of excavated material, and all

excavations and other work resulting from slides, cave-ins, swellings or upheavals shall be at the Contractor's cost and expense.

2. All spaces beneath foundations resulting from unauthorized excavations or from slides or cave-ins, shall be refilled at the Contractor's expense with concrete or foundation material, and at no cost to the County. The final trimming of the bottom and sides of excavations against which masonry is to be built shall be done just before the concrete is placed.
3. For unstable conditions requiring outside forms, seals, sheathing, and bracing, or where groundwater is encountered, any additional excavation in width and backfill required shall be done at the Contractor's expense.

D. Sheeting and Shoring.

1. The Contractor shall furnish, place, maintain and remove, except as provided for hereinafter and under Item 7, such sheeting, shoring and bracing as may be required to support the sides of the excavations and to prevent any movement which could in any way injure the work, human life, or adjacent structures and property, obstruct surface drainage channels or water ways, or otherwise injure or delay the work.
2. Such cofferdams or other means for constructing and protecting adjacent structures and the foundations for all pipe lines, conduits and structures, as are necessary or required, shall be constructed by the Contractor, and the entire cost and expense of such work shall be considered as included in the unit price for excavation or lump sum price stipulated for the respective items of the work. Where ordered by the Engineer, wood sheeting supporting trench walls below the top of the pipe shall be left in place and cut off as directed by the Engineer; payment for such sheeting left in place will be on a fixed price basis as specified under Item 7.
3. Except when ordered left in place by the Engineer, wood sheeting above the top of the pipe, braces, shores, walers, or stringers shall not be withdrawn until the backfill is practically complete. As the backfill progresses to the elevation of a set of walers and braces, such bracing shall be removed. All sheeting and bracing specified or shown on the drawings or directed by the Engineer to be left in place shall be so left. All sheeting left in place shall be cut off at least three feet below final finished grade. During the removal of sheeting, care must be taken to prevent movement of the sides of the excavation. All voids left by the withdrawal of sheeting shall immediately be carefully filled.
4. Whenever the Engineer, in writing, orders any sheeting, shoring, bracing or foundation material left in place, or when so shown on the drawings or specified, the Contractor will be paid for the actual amount so left in place at the fixed prices stipulated for the applicable items.
5. Sheeting, shoring and bracing left in place by the Contractor for his own convenience will not be paid for under any item.

E. Removal of Water. The Contractor shall keep all excavations free from water while the excavation for or the construction of structures, pipe lines, conduits or foundations

is in progress; shall build all dams, bulkheads, underdrains, sumps and other work necessary for this purpose; and shall provide and keep in operation, or ready for operation, a pump or pumps, and temporary conduits of sufficient capacity to keep the excavation dry and free from water at all times.

1. The Contractor shall provide for the disposal of all water removed from the excavations in such a manner as to prevent injury to the public, the public health, public or private property, or to any portion of the work completed or in progress, or to the surface of the streets, or to cause any inconvenience to the public or waterways. All discharged water shall conform to the water quality standards as specified by the Ohio EPA's Notice of Intent NPDES General Permit or that specified in the Contract Documents.
2. No pipelines, conduits, or structures shall be laid or built-in water, and water shall not be allowed to flow over or rise upon any concrete, for a period of twenty-four (24) hours after the concrete has been placed.
3. The flow of water or sewage in all existing sewers, drains, gutters or water courses encountered during the construction period shall adequately be maintained by the Contractor at his expense in a method approved by the Engineer.

F. Structure Protection. Temporary support, adequate protection, maintenance and restoration of all underground and surface structures, drains, sewers, water lines, gas lines, conduits and other obstructions adjacent to or encountered in the progress of the work shall be furnished by the Contractor as provided in the General Conditions.

G. Backfilling. As various structures or parts of structures are completed, the Contractor shall refill the space outside and around the walls with materials excavated from the site and stored for the purpose, unless other backfill materials are specifically called for on the drawings or required by the Engineer.

1. See Detail Drawing No. 1 Bedding and Trench Details for Construction Outside of Roadways and Detail Drawing No. 2 Bedding and Trench Detail for Construction Under Pavement.
2. All materials used for backfilling shall be free from all perishable and objectionable material and shall contain no stones larger than three (3) inches in diameter. The material used for backfill or bedding shall be moistened and shall be well tamped or otherwise thoroughly compacted under, around and over the pipe or conduit in such a manner as to prevent settlement.
3. Trenches for sewers, water pipe, conduits and other arched structures constructed in place, after the arching is completed and before the centers are struck, or after the pipe has been placed and the joints have been properly made, shall be carefully backfilled by depositing without shock, and by tamping with approved mechanical equipment, suitable earth or other selected material or bedding material where called for under and around the sides of the conduit or pipe, and to a height of not less than one (1) foot above the top of the arch or pipe.
4. This backfill or bedding shall be tamped and graded evenly across the trench and must be done at once, and in particular before any fill is deposited directly from a bulldozer, machine, bucket, trucks or other vehicles. The backfilling shall be

brought up evenly and all eccentric loading shall be avoided. In no case shall dumping's from a bucket be allowed to fall directly upon the sewer arch, conduit or pipe line; the bucket must be lowered sufficiently so that shock of the falling backfill will not injure the structure.

5. All backfill in trenches under street and driveway pavements shall be thoroughly compacted as specified hereinafter, using approved tampers before replacing any pavements, either permanent or temporary. Types of tampers allowed include padded drum vibratory soil compactors or other comparable devices as approved by the Engineer. Use of a mechanical roller attachment (except at conflicting utility crossings) is not an approved method for compaction. Use of a backhoe bucket for compaction is prohibited. Soils may be sprinkled, if necessary, at the time of backfilling to maintain the optimum moisture content at the time of compaction.
6. The backfilling of trenches under all roadways shall follow the completion of the work as closely as the type of construction will permit. Special care must be taken so as not to disturb the pipe line or conduit. The bedding shall be haunched and tamped solidly under and around the pipe line or conduit with proper tools for that purpose. The remainder of the backfill shall be deposited in layers not exceeding eight inches in thickness, when compacted, each of which shall be compacted by an approved padded drum vibratory soil compactor or other comparable device as approved by the Engineer, to obtain the degree of compaction required.
7. Where special conditions warrant, the Engineer may authorize the use of crushed stone, gravel or other granular backfill, trench topping, or applications of dust control. All such work will be paid for in accordance with the provisions of the applicable item.

H. Disposal of Excavated Materials. Excavated material shall be disposed of, as appropriate, in backfilling and grading to the lines and grades shown or given by the Engineer.

1. The finished ground shall be graded level or to even slopes around the buildings, as shown on the drawings or as required by the Engineer.
2. Any excess earth, paving or other materials from excavation, not required in nor suitable for backfill or repaving, shall be hauled to such locations as approved by the Engineer.
3. Surplus materials become the property of the Contractor and he shall dispose of them at his own expense.
4. The surfaces of all graded and spoil areas shall be left in a smooth level, or evenly sloped condition, free from stones, rubbish or other debris.
5. Whenever street railway ties or rails are removed, such ties and rails shall become the Contractor's property.

I. Rolling and Tamping. Where excavation or filling is done in connection with the construction of roadways or walks of any material, the subgrade shall be dressed true to elevation and contour and shall be consolidated and all depressions filled.

1. The compaction shall be continued until the subgrade is firm.

2. The Engineer shall determine if compaction testing is required and will do so at the Owner's expense.
3. If the compaction test fails, the Contractor shall remove the deficient material and replace it with suitable material.
4. Any additional testing shall be at the expense of the Contractor.

J. Tunneling. Tunneling will be permitted under trees and under water and gas service pipes for a length not to exceed fifteen (15) feet. Elsewhere, tunneling will not be permitted unless specified under other items.

K. Rock Excavation.

1. In removing rock, special care shall be taken to excavate it as closely as possible to the required line and grade. The surface of all rock shall be sufficiently rough to bond well with any masonry structure. Rock surfaces against which masonry will be constructed shall be thoroughly cleaned of all dirt, loose rock, boulders, gravel, snow, ice, or other objectionable substances.
2. Blasting may be permitted by the Engineer only as a last resort for rock excavation unless prohibited by local ordinances or regulations. The Contractor shall engage the services of a professional geotechnical engineer registered in the state of Ohio experienced in the geology of blasting to perform a study on the efficiency and the effects of blasting for rock removal. If blasting is advocated, a pre-blasting survey shall be performed to aid in determining the disposition of blasting damage claims.
 - a. When permitted, the Contractor must use all possible precautions to prevent accidents or damage on account of explosions or the use or storage of explosives. The Contractor shall supply a certified seismologist during all blasting operations to monitor the shock waves.
 - b. Explosives shall be used, handled, and stored, as prescribed by all applicable laws and regulations. All explosives shall be kept in a safe place at a sufficient distance from all work so that in case of accident no damage will occur to any part of the work.
 - c. The drilling of holes for explosives shall be done with pneumatic tools; dust from drilling operations must be controlled so as to cause no inconvenience to workmen or the public.
 - d. Blasting shall be conducted so as not to endanger persons or property and, whenever required, the blast shall be made before the original cover has been removed or it shall be covered or otherwise satisfactorily confined. The Contractor shall be held responsible for and shall make good any damage caused by blasting or any accidental explosions.
3. If the County does not designate where such surplus materials are to be disposed of, they become the property of the Contractor and he shall dispose of them at his own expense, except that no rock be permitted in the backfill.
4. All backfilling shall be performed in accordance with the provisions of Item 1. No rock shall be used in the backfill. Should additional earth, not available from the excavation, be required to complete the backfill, it shall be obtained and included under the item for which the excavation was necessary.

5.0 ELECTRICAL. This section is not applicable.

6.0 QUALITY ASSURANCE.

- A. Testing.** Any earth backfill which is permitted within shoulder or permanent pavement areas, except that covered in the following paragraph, shall be compacted until the density of each layer becomes not less than that required by the following table:

1. Max. Lab. Dry Wt. Pounds per Cu. Ft.	Minimum Compaction Required % of Max. Lab. Dry Wt.
* 90.0 - 102.9	100
103.0 - 109.0	98
110.0 - 119.0	96
120.0 and over	95

* Materials weighing less than 90.00 lbs./cu. ft. are unsuitable.

2. Any earth backfill which is permitted within shoulder or pavement areas for a depth of one foot below a permanent pavement shall be compacted in layers as indicated in the following table:

Max. Lab. Dry Wt. Pounds per Cu. Ft.	Minimum Compaction Required % of Max. Dry Wt.
** 103.0 - 109.9	102
110.0 - 119.9	100
120.0 and Over	98

**Materials weighing less than 103 lbs./cu. ft. are unsuitable.

3. The County reserves the right to acquire samples of and perform tests on the material intended to be used as backfill for the aforementioned applications.
- After material density has been determined by laboratory testing, and found to be acceptable, the applicable compaction requirements must be met.
 - Compaction tests shall then be taken and if the required percentages are not attained, compaction will continue until the requirements are met. Testing shall be accomplished by the Engineer or his agent or by a laboratory selected by the County at no cost to the Contractor.
4. Materials unsuitable for backfilling shall be replaced with material as specified and paid for under the appropriate item.

B. Observation.

1. SCMSD designated representative will visually observe the work performed. The representative will notify the Engineer of any discrepancies with the contract documents in the course of the contractor performing the work. The progress observations by the SCMSD do not waive any rights or remedies, nor divest the Contractor of any responsibility for contract compliance or liability for damage.

C. Warranty. This section is not applicable.

7.0 MEASUREMENT. Unless specifically ordered otherwise by the Engineer, the amount of excavated material and that material brought in to act as backfill shall be included in the overall excavation requirements as put forth in the Contract Documents. Where specified, exceptions are as follows:

A. Additional Earth Excavation. The quantity of additional earth excavation to be paid for under Item 1A shall be the total number of cubic yards of additional excavation, measured from a plane two (2) feet below the proposed subgrade downward to the surface of suitable soil as determined by the Engineer.

1. Unless otherwise specified, Item 1A will be paid for only when the material is placed directly in its final position or re-handled.
2. Additional earth excavation will be measured as shown on the drawings or as specified with the lowest elevation at the surface of the rock (or excavation of any other than earth).
3. Where the limits of excavation for one structure intersects or overlaps the limits of excavation for another structure, no additional excavation shall be measured for payment within this intersection or overlapping.

B. Rock Excavation.

1. All excavated material in its natural state which, when not frozen, requires drilling and blasting or drilling and wedging for its removal, and all boulders one-half (1/2) cubic yard and over in volume, shall be termed rock excavation. Material which can be loosened with a pick but which, for convenience or economy, is loosened by drilling and blasting, or by drilling and wedging, and material which is exterior to the limits of measurement allowed, shall not be measured or classified as rock excavation.
2. Concrete, (not including pavements, pavement bases, curbs, sidewalks and steps encountered in the excavation) and boulders having a volume of one-half (1/2) cubic yard or over, shall also be termed rock excavation.
3. Wherever rock excavation is required within the pay limits for excavation, the entire amount of necessary rock shall be excavated; any excavation outside the pay limits will not be measured for payment.
4. Excavation above the elevation of the top of the rock will be paid for as earth excavation. Payment will be made only for rock excavation within the lines and grades given and within the following defined limits.

- a. Rock excavation for structures: unless otherwise specified or shown on the drawings, shall be measured between vertical planes two (2) feet farther apart than the outside dimensions of the foundations of the structures and from the surface of the rock to the neat lines of the bottom of the structures.
 - b. Rock excavation in trenches: unless otherwise specified, shall be measured as having vertical sides and a width one and one-half (1-1/2) feet greater than the internal diameter of the pipe, to a horizontal plane six (6) inches below the bottom of the pipe.
5. Should rock be encountered; additional earth excavation shall be measured to the top of the rock.
 6. No allowance will be made for excavation beyond the above defined limit when made by the Contractor for working space, pump sumps, drainage ditches or other like purposes.

C. Trench Undercut and Wrapped Aggregate. The excavation limits required for trench stabilization shall be determined by the Resident Representative or Project Engineer once either is alerted to unsuitable trench conditions by the Contractor.

1. The Resident Representative or Project Engineer may require the advice of a geotechnical professional, who will submit his opinion as rapidly as practicable.
2. The Contractor shall not be eligible for delay compensation while the geotechnical professional is forming his opinion.

D. Tunneling. Measurement and payment will be made as specified for open-cut pipe installation.

E. Approximate Fill Elevations. For finished grades, fill around structures to be built under this Contract are shown on the drawings.

1. The elevations are believed to be reasonably accurate, but do not purport to be absolutely so, and are presented only as an approximation.
2. The Contractor shall be responsible to perform examination of the site, as to the existing and proposed elevations and the amount of work required by this item.

8.0 PAYMENT. The cost for all labor, equipment, tools, and all other items necessary and incidental to excavation and backfill, except as detailed below and agreed to by the SCMSD, shall be included in other Items. The Contractor shall assume all responsibility for any expense or other liability which may arise by reason of any material, obstacle or condition, foreseen or unforeseen, encountered or manifest during the prosecution of any work which is specified or required under this Contract.

<u>Item</u>	<u>Unit</u>	<u>Description</u>
1A	CY	Additional Earth Excavation
1B	CY	Rock Excavation
1C	LF	Reinforced Trench/Undercut & Wrapped Aggregate

END OF SECTION