

SPECIAL CONDITIONS

SECTION I - MATERIALS

BRICK: (FOR MANHOLES):

All brick shall be clay brick conforming to the requirements of ASTM C-62 latest edition. No concrete brick is to be used. Concrete Manhole block conforming to ASTM C427-58T may be used in lieu of clay brick.

CONCRETE, PORTLAND CEMENT

Portland cement shall conform to the requirements of ASTM C-150. Concrete used on this project shall develop a strength of not less than 3,000 psi at 28 days except that bedding concrete, and manhole bottoms may develop only 2,000 psi at 28 days. This concrete shall be made from an acceptable aggregate, and shall be based on a design mix which has been approved by preliminary compressive strength test. Water content shall not be increased from the amount shown in the design mix unless additional cement is added. The Contractor may be required to add extra cement without cost to the Owner if the mix adopted does not attain the required strength.

CONCRETE, CONSISTENCY OF

The consistency of concrete mixtures shall be controlled by a slump test. Slump test as follows: Mass concrete 1-1/2" to 3" slump; heavy sections with reinforcement 4" to 6" slump. In deep sections poured rapidly, where water accumulates, the slump shall be reduced until the accumulation of water disappears.

CONCRETE, CURING OF

Concrete shall be protected from extremes of heat and cold until well seasoned. The surfaces of exposed concrete shall be sprayed with a pigmented membrane curing which will prevent the loss of moisture. The curing compound used shall meet the requirements of AASHTO M-148, Type II.

CONCRETE, DEPOSITING

Concrete shall be deposited in such a manner as to prevent the separation of ingredients and permit most thorough compacting. In general, concrete must be deposited in horizontal layers of uniform thickness, and shall be deposited within forty-five (45) minutes from the time it is mixed.

The E/A reserves the right to require vibration in place if he deems it desirable.

When placing of concrete under water is permitted by the E/A, special care shall be taken to prevent the cement from floating away and to prevent the formation of laitance. All concrete so placed shall have the cement content increased by ten (10%) percent, and no additional compensation over the bid price for this class of concrete will be allowed.

CONCRETE, PLACING IN FREEZING WEATHER

No concrete shall be mixed or deposited when the temperature is less than 35 degrees within the next twenty-four (24) hours, special precautions are taken to prevent freezing. No concrete shall be laid on a subgrade containing frost, and no material containing frost, shall be used in the concrete.

CONCRETE, REINFORCEMENT

Reinforcing steel shall be provided with standard hooks, where shown on the plans and shall be set in place on chairs, etc., according to accepted good practice.

CONCRETE SIDEWALK AND DRIVE FINISH

When concrete is placed, it shall be well spaded so that all coarse aggregate will be below the surface. It shall then be struck off, leaving no laitance, and troweled true to grade.

CONCRETE, SURFACE FINISHING

As soon as the concrete has set sufficiently to permit, the forms shall be carefully removed, and all depressions not called for in the plans shall be carefully brought up to line and pointed out with mortar.

The surface film of all such repairs shall be carefully removed before settling occurs.

No cement wash or plastic coating will be allowed.

IRON CASTINGS

The Contractor shall furnish and install all miscellaneous iron castings, including manhole frames, covers, steps, bolts, inserts, brackets, supports and other such iron castings as are shown on the plans.

Unless otherwise specified, castings shall be grey-iron, bituminous coated, conforming to Federal Specifications QQ-I-852.

MORTAR

Mortar shall be composed of one part Portland cement, one part masonry mortar mix and six parts sand, thoroughly mixed.

PIPE, CAST IRON

Cast Iron Pipe shall conform to the latest requirements of American Standards Association A21.1, Type III mechanical joint, except that the slip on type joint, using rubber gaskets may be used. This pipe shall be class 150/22, cement lined and shall have a bituminous seal coat.

PIPE, REINFORCED CONCRETE

Reinforced concrete pipe for storm drains shall conform to the requirements of ASTM C-76, latest revision.

PIPE VITRIFIED CLAY

Vitrified clay pipe shall conform to the requirements of the Specifications of the American Society for Testing Materials, C200-64T, with latest revisions, for Extra Strength Pipe as manufactured by Oconee Clay Products Division, Pomona Pipe Products, Inc., W. S. Dickey Company, Georgia Vitrified Brick & Clay Company, or approved equal.

PIPE, V.C. AND JOINTS

Joints for Vitrified Clay pipe shall be factory made, resilient type joints conforming to the requirements of ASTM C425-58T including latest revisions, Type III as manufactured by Oconee Clay Products Division, Pomona Pipe Products, Inc., W. S. Dickey Company, Georgia Vitrified Brick & Clay Company, or approved equal.

Resilient type jointing materials shall be chemically resistant and stable. They shall be compounded out of materials that, when molded into joint enclosures, will allow them to achieve a residual compression of at least 30 psi, shall exhibit sufficient flexibility when joined to allow a deflection in the amount of 1/2" per foot without visible leakage when tested under internal 10 foot head pressure; shall present sufficient resistance to shell loading to allow a weight of 100 pounds per inch in diameter to be uniformly applied over not less than 120 degrees without visible leakage when tested with an internal 10 foot head of pressure.

PIPE, ABS TRUSS

Truss pipe is defined as an internally-braced-double-wall pipe for use as gravity sanitary sewer.

The pipe shall be composed of virgin ABS compound as specified in ASTM D-1788-62T Type I or IV. The pipe shall be as manufactured by Armo and meet in every way manufacturer's specification 41-M-3.

Couplings and fittings shall be manufactured of materials having equal or superior chemical and physical characteristics as the pipe itself.

PIPE, ABS JOINTS

Joints shall be made with solvent weld type couplings installed in accordance with the

MANUFACTURER'S RECOMMENDATIONS

CRUSHED STONE UNDER PIPE

Stone for pipe under drain shall be either S.C.H.D. designation #3 or #5.

QUALITY OF MATERIALS

Only new materials, conforming to the requirements of these specifications and approved by the E/A shall be used on the work. All materials proposed to be used may be inspected and tested at any time during their preparations and use. If, after trial, it is found that sources of supply which have not been approved, do not furnish a uniform product, or if the product from any source becomes unacceptable at any time, the Contractor shall furnish materials from another approved source. No materials which after approval, have in any way become unfit for use shall be used in the work.

Materials indicated on the drawings are required in the work, but not covered in detail in the specifications, shall be of the best quality available and shall conform to the current specifications of the American Society for Testing Materials, as approved by the E/A.

VITRIFIED CLAY SEWER

Visual inspection for shape, cracks, blisters, evidence of vitrifications, and hammer test. Laboratory test in amounts and character per ASTM C-13 or C-200 as specified. These tests shall be made by the Supplier.

REINFORCED CONCRETE PIPE

Visual inspection for shape, uniform density; hammer test.

SAND, MORTAR

Mortar sand shall be what is locally known as builders sand.

SECTION II - SEWERS AND APPURTENANCES

SCOPE OF WORK

The Contractor shall furnish all materials, tools, labor, and equipment to construct sewers, together with foundations, manholes, and appurtenances as shown on the plans or specified. The work shall include all clearing, grubbing, excavating, ditching, sheathing, backfilling, finishing, drainage and testing; all provisions necessary to protect and maintain buildings, fences, water lines, storm drains, power and telephone lines, and cable, and other structures; the furnishing of suitable bridge and footways across intersected street, the replacing of pavement, sidewalks, curb and gutters, the cleaning away of all debris and surplus materials, and any and all other work necessary to put in complete working order, the specified sewers and appurtenant structures.

WORK IN BEAUTIFIED AREAS

Since it is necessary to place certain portions of the sewer through beautified areas such as lawns, gardens, etc., special care is to be taken by the Contractor as noted below, to leave the area in the best possible condition.

The Contractor shall retain the services of a competent nurseryman who shall supervise the moving and replacing of plants, shrubs, and planting beds in all areas disturbed by sewer construction.

LINE AND GRADES

All layout will be accomplished by the Contractor. Temporary bench marks have been established in the field and are shown on the drawings. These temporary bench marks are shown for the convenience of the Contractor and are to be verified by him from a permanent Geological Survey point adjacent to the site before work proceeds.

The Contractor is to set all grades from information shown on the Plan and Profile Sheets. This data, upon verification by the Engineer, shall be basis for payment, rather than the original plotted profiles.

ORDER OF WORK

The Owner reserves the right to use any portion of the work when it is considered to the public interest to do so. The Engineer shall have the power to direct on what portion of the lines the Contractor shall work.

STREET CROSSINGS, ETC.

At street crossings and other points as directed by the Engineer, the trenches shall be bridged in such a manner as to prevent a serious interruption of travel upon the roadway or sidewalk and also to provide access to public or private premises. The material used and the manner of constructing these bridges and approaches must be to the satisfaction of the Engineer. The bridges and approaches must be built to the satisfaction of the E/A. The cost of all such work is to be included in the unit price for the pipe laid.

INSPECTION

All work accomplished and materials installed shall be subject to inspection by the Engineer and by the South Carolina Officials concerned. All improper work disclosed by such inspection shall be reconstructed. All rejected materials shall be immediately removed from the site.

CLEARING AND GRUBBING

The Contractor shall accomplish clearing and grubbing necessary to provide working space within the width of the right of way. Trees and stumps shall be disposed of by burning, if local laws permit; otherwise, they shall be removed from the site.

At the completion of construction work, the entire disturbed portion of the right of way is to be fine graded and left in a natural condition, approaching as nearly as possible that of the ground before work began.

TIMBER

All usable timber shall be cut in lengths as designated by the landowner and stacked on the edge of the right of way. This timber shall remain the property of the landowner.

EXCAVATION

The Contractor, is to do all excavation, of whatever substance is encountered as shown on the plans, for all sewers and appurtenances. No excavation is to begin until the Contractor has on the site at least one "hydro-tamp" or other backfilling tamper in a first class working condition.

Said excavations shall be by open cut unless otherwise directed. No tunneling shall be accomplished without permission of the E/A. The lower portion of the trench, to a height of two (2) feet above the pipe shall not be greater than the diameter of the pipe plus twelve (12) inches. If trenches are excavated wider than specified or collapse, the Contractor will be required to use special methods of bedding the pipe as specified herein at his own expense.

At the option of the Contractor, mechanical excavation shall either terminate four (4) inches above invert grade with the remaining depth excavated manually or after the mechanical excavation has been completed, suitable fill material shall be returned to the trench and brought to the proper grade by mechanical tamping to a density of ninety-five (95%) percent of maximum and rounded to fit the pipe barrel. The width of the trench at the bottom shall be twelve (12) inches wider than the pipe, so that the pipe may be laid without undercutting the walls of the trench. Excavated materials not required for backfilling shall be removed from the site and disposed of by the Contractor as directed by the E/A. Excavation for manholes, and other appurtenances, is to have twelve (12) inches minimum to twenty-four (24) inches maximum clearance on all sides.

Soil which is unstable, in the opinion of the E/A, shall be removed from under the pipe and structures to a depth of four (4) inches and replaced as specified hereinafter. The bottom of all trenches shall be rounded to conform to the bottom quadrant of the pipes so as to afford full bearing on the pipe barrel. Bell holes shall be excavated so as to relieve pipe bells of all load, but these holes shall be small enough to insure support throughout the length of the pipe barrel.

Trench excavation shall not proceed more than 300 feet ahead of the pipe laying, or such a distance which cannot be backfilled before dusk, whichever is the lesser, unless special permission is received from the E/A.

SHEATHING AND BRACING

All trenching shall be securely held by bracing or sheathing as required by the soil conditions encountered, unless otherwise permitted by the Engineer. If sheathing is used, the bottom width of the trench in the clear shall be twelve (12) inches wider than the bell of the pipe. In water bearing soil, no portion of such sheathing below the level four (4) feet above the pipe shall be removed.

BACKFILLING

All excavation shall be backfilled immediately after the pipe is laid and inspected by the Engineer. The backfilling material shall be selected and placed with care so as to provide for the future safety of the pipe. Except where special methods of bedding are provided for, selected clean earth or sand shall be solidly tamped about the pipe to a level at least two (2) feet above the top of the pipe. Care shall be taken to see that said tamping does not damage the pipe. The remainder of the trench may be backfilled with general excavated material, provided such material does not contain more than one-third broken rock, or boulders weighing more than fifty (50) pounds. Backfilling shall be carried on simultaneously on both sides of the pipes as far as not to displace it. In addition the moisture content of the backfill material shall be kept within three (3%) percent of optimum.

For all pipe laid in streets, tamping by mechanical means will be required to consolidate the entire excavation to a density of at least ninety (95%) percent of maximum, when tested in accordance with AASHTO method T-99. The top six (6) inches shall be compacted to a density of ninety-five (95%) percent of maximum. Testing to be paid for by the Owner.

In all paved areas, the compacted subgrade shall be left flush with the existing paving except those portions of the trench which are to receive a base course before nightfall. This is to say that the Contractor has the option of installing a base course as he proceeds or of leaving the subgrade flush with the pavement as he backfills and at a later date (within the time specified) returning and removing the subgrade to the proper depth (or recompacting the subgrade to obtain this depth) to receive the base course.

The attention of all bidders is directed to the fact that in beautified areas special care must be taken to see that topsoil is not indiscriminately mixed with trench excavation. Instead, the topsoil is to be replaced so that the area will be left in as nearly its original state as possible.

Any settlement which occurs in trenches for one year after acceptance of the project shall be the responsibility of the Contractor who will be required to correct immediately such settlement upon notification by the E/A. Settlement occurring in paved areas shall be repaired by repaving the entire width of the street with asphaltic concrete at the expense of the Contractor. The Contractor shall utilize power brooms and water flushing as is necessary, in the opinion of the E/A, to clean the pavement initially and to maintain same relatively dust free until the trench is resurfaced. If these measures prove ineffective, in the opinion of the E/A, the Contractor shall be required to place calcium chloride or other hygroscopic chemicals over any or all areas at a rate to be prescribed by the E/A, in order to control the dust. No additional compensation shall be allowed for the application of this material.

Backfill outside of paved areas and road shoulders may be accomplished by mounding the fill over the trench and allowing natural settlement to occur. Before the project is completed the Contractor will be required to rework settled or mounded areas such that the trench surface will be left flush with the adjacent ground surface.

EMBANKMENT FOR SEWER

Whenever the sewer is on an embankment or in cut, with less than eighteen (18) inches between the top of the pipe and normal ground surface, the pipe shall be covered with a carefully made fill, well tamped in thin layers to a point at least two (2) feet above the top of the pipe. The top of the fill shall be not less than three (3) feet in width and the side slopes not steeper than two horizontal to one vertical, unless other dimensions are ordered by the E/A. All filled areas shall be left so as to drain properly.

SPECIAL BEDDING AND TAMPING

Special bedding and tamping will be required under certain conditions as follows: Whenever the trench walls collapse or where the trench is excavated in excess of the specified depth.

In the above cases, the bottom of the trench shall be shaped as specified to a depth four (4) inches below the bottom of the bell. The bedding shall then be brought to the proper level by spreading and tamping a layer of moist and to conform to the outside of the barrel. After the pipe is laid, the sheathing shall be removed or cut off as specified. The remainder of the trench shall be backfilled as specified. Careful attention must be given to avoid disturbing the pipe grade and alignment. No extra payment will be allowed for these special bedding conditions.

In wet or unstable trench bottom conditions, washed crushed stone shall be placed to a depth four (4) inches below the bottom of the bell as is shown in the drawings for "Type II Bedding". No extra payment will be allowed for the crushed stone and the excavation.

Special concrete bedding as shown on the drawings for "Type III Bedding", will be required for sewers under certain conditions as follows:

- 1) Where trenches over twelve (12) feet in depth are excavated to widths in excess of those specified, or if trench walls collapse.
2) Wherever designated by the E/A, if poor soil conditions warrant.
The pipe shall be bedded in concrete having a 28-day strength of 2,000 pounds with at least four (4) inches concrete under the pipe barrel and spread over the entire width of the trench, to a depth of one-fourth the outside diameter, of the sewer. No extra payment will be allowed for special concrete bedding under the first condition. Payment for special bedding under the second condition will be made for field measured quantities at the price bid for 2,000 pound bedding concrete.

"Type IV and V Bedding", as shown on the drawings, shall be used if required by the E/A, payment will be as for "Type III Bedding".

"Type VI Bedding" shall normally be used when a minimum clearance is available at such places as crossings over culverts, etc. Payment for the cast iron pipe and man shall be included in the unit prices. Payment for the concrete shall be as for "Type III Bedding".

LAYING PIPE

Pipe shall be so laid in the trench that the interior surface shall conform reasonably accurately with the grade and alignment, as directed by the E/A. Pipe laying shall be done so as to disturb as little as possible, the pipe previously laid and, unless otherwise directed, the pipe should be laid upside with spigots pointing down grade without any break in line or grade between manholes. Before laying, the pipe shall be wiped clean of all dirt and foreign matter, and the joints of all bells and spigots shall be clean and dry. The interior of the pipe shall be carefully freed of all dirt and surplus material as the work proceeds. In general, the pipe shall be installed in accordance with the requirements of ASTM-C-12, except those items specifically called for in these specifications shall govern over those of the ASTM requirements, should there be any conflict.

Measurement of sewer lines will be made on the basis of the horizontal distance between centers of manholes, with no deduction for the space occupied by the manholes. When work of pipe laying is suspended at any time, the end of the sewer is to be kept closed with a tight cover.

INFILTRATION

Pipe joints shall attain a maximum limit of 500 gallons per inch of diameter per day per mile when field tested by actual infiltration conditions. In addition, in no stretch of the sewer between two adjoining manholes, shall the leakage of ground water into the sewer amount to more than 0.1 gallons per inch in diameter per foot of pipe per day. In the event the leakage exceeds this amount, the sewer will not be accepted until repaired at the Contractor's expense, such that it will comply with the requirements.

INSPECTION OF JOINTS

JOINTS shall not be covered until approved by the E/A. After joints have been inspected and approved the pipe shall be backfilled as previously described. The Contractor shall flash a light between manholes, if so requested and if the alignment is found to be true and no pipes are misplaced, backfilling may be continued.

TRENCH CLEANING AND TESTING

Before the sewer system is accepted, it shall be tested and cleaned to the satisfaction of the E/A. If any obstruction is found, the Contractor will be required to clean the sewer by means of rods or other equipment. The pipe line shall be straight with a uniform grade between manholes.

MANHOLES

Manholes shall be constructed at such points designated by the plans or as directed by the E/A. The invert elevation of the manhole shall be on the fly line at the center of the structure. Manhole and inverts and bottom curve shall have the same shape size as the inverts connected, and shall be neatly built in form so as to facilitate the entrance and flow of sewage.

The invert shall be constructed of concrete, finished perfectly smooth without holes or bumps.

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When required, short length of pipe of the required size shall be built into the manholes at the elevation indicated on drawings. Each stub shall be provided with a stopper, lightly cement in place. Standard brick manhole bottom shall be made of concrete and have a 28-day compressive strength of 2000 pounds. Walls shall be built of a good quality common brick. The brick shall be whole, hard burned and free of salmons and pinks. All brick will not be acceptable. Immediately prior to laying, the brick shall be saturated in water. All brick shall be carefully embedded in mortar in bottom and sides, with interior joints struck flush. Outside walls of manholes shall be plastered with a smooth coat of cement mortar as specified, not less than three-fourths inch in thickness.

Tops of manholes shall be built slightly above the grade of the new pavement. In beautified areas, the manholes shall be built approximately one foot above grade. Measurement for payment shall be from the top of the casting to the invert.

STORM DRAINAGE

The Contractor shall maintain surface drainage on streets, and in other areas during construction shall restore drainage to their original lines and grades immediately after backfill of the sewer trench. The Contractor shall remove drain pipe at driveways, etc., within the limits of trenching and relay same after the sewer is in place. At those places where storm drains conflict with the proposed sewer line, the Contractor shall remove and relay the storm drains, adding new pipe as required by the Engineer. All cost of maintaining surface drainage adjacent to construction, and for removing and relaying drain pipe shall be included in the bid price for sewers.

STORM DITCH EXCAVATION

Wherever storm water drainage is obstructed by sewer construction, the Contractor shall construct new ditches or change the shape of the existing ditches in accordance with the Engineer's direction to accommodate the storm water drainage. No additional payment will be allowed for this work.

PROTECTION OF UTILITIES AND STRUCTURES

Any damage done to utility lines, including overhead or underground, services or structures of any nature shall be repaired by the Contractor at his own expense.

CRUSHED STONE UNDER PIPE

The Contractor shall place sufficient crushed stone (washed) under the pipe to insure that after laying and backfilling the completed sewer is on the line and grade (it will be tamped and inspected by the E/A to see that these conditions are met). The cost of this crushed stone shall be included in the unit price for the installed pipe. No additional payment shall be made for this item.

RIGHTS OF WAY

The Owner has acquired rights of way through private property for construction of the sewers for a width of 10' on each side of the center line of the pipe. In no case has a right of way been acquired closer than five feet from the foundation of any house. The Owner's permission will be required before specimen trees may be cut outside of the limits of the permanent right of way 10' on each side of the center line of the pipe.

PROTECTION OF TREES

The Contractor is to make every possible effort to avoid damage to trees within the rights of way. In narrow rights of way small rubber tired backhoes may be required, in some cases, in order to negotiate the space between trees.

HOUSE SERVICE CONNECTIONS

General: House service connections shall be placed to the property line for each dwelling and/or commercial building in the area unless designated by the E/A to the contrary. In the absence of specific information from the E/A or the property owner the service connection shall terminate on the property line at a point exactly ten feet upgrade of the low property corner.

It is the intention of these specifications that the Contractor shall contact the property owners whenever feasible and that he shall cooperate with the property owner in the placement of the services, following the instructions given in the plans and specifications. In the event of any discrepancy, the Contractor shall ask the E/A for instructions.

Grades: The service shall be placed to a minimum grade of 1% and shall be left low enough to give basement service to the building to be served unless otherwise designated by the E/A. If the E/A indicates that only first floor service can be given, said service shall be placed low enough to give first floor service with a minimum of 2'-0" cover to the building. It is the responsibility of the Contractor to meet these requirements. Should there be any question as to the inverts of the lateral sewer making these requirements possible, this question is to be directed to the E/A for a decision. Failure on the part of the Contractor to place the service to the grades specified shall make the Contractor liable for paralleling the lateral sewer to a point where grade can be met.

Pipe Laying: In general, pipe methods and materials, including infiltration, shall be as covered elsewhere in these specifications and as shown on the typical House Service Connection Detail. Wyes are to be placed by the Contractor at the proper point to permit the requirements of these plans and specifications to be met. Further, it is anticipated that the services will be placed at the time the lateral sewer is placed. Written permission is to be obtained from the E/A if any other plan is to be followed.

Maps: Maps showing the location of wyes and the services stationed and properly referenced to points such as property corners, power poles, fire hydrants, etc., shall be prepared by the Contractor as work progresses. No payment shall be made for a particular section of sewer until acceptable maps as described have been turned over to the E/A.

EXISTING SURFACE DRAINAGE

Whenever the sewer is placed in or adjacent to an existing swale, ditch or area which acts as a surface drain, the Contractor will be required to establish turf by sodding, if necessary, and to maintain for a period of one year from the time the area is disturbed.

MAINTENANCE

Any shrubs within the limits of the right of way which die within one year as a result of the construction work shall be replaced by the Contractor at no cost to the Owner or Property Owner.

Pavement and road shoulders shall be maintained by the Contractor for one year after completion of the job.

SIDEWALKS, DRIVEWAY ENTRANCES AND CURBS & GUTTERS - REMOVAL AND REPLACEMENT: All sidewalks, driveway entrances and curbs & gutter sections damaged by the Contractor shall be removed and replaced. All portions of the damaged structure between existing joints shall be removed and replaced. No patching shall be permitted.

ROCK EXCAVATION: Payment for rock excavation shall be made on a width equal to the diameter of the bell plus 12".

Rock shall be considered to consist of such material which in the opinion of the E/A cannot be removed with standard ditching machinery. Rock shall be removed to provide a clearance of not less than 6" in a horizontal direction from all parts of the pipe or other appurtenances. If rock is encountered at trench grade, it shall be removed to a depth of 4" below the bottom of the bell and refilled with selected and tamped material shaped to the pipe as specified.

BLASTING operations shall be conducted in accordance with existing ordinances. All exposed structures shall be carefully protected from the effects of blast & covered with heavy timber or other suitable material. The blasting shall be done by persons experienced in this line of work. All damages to be promptly repaired by the Contractor at his own expense. Blasting shall not be permitted adjacent to existing buildings or structures.

Project information block including: TOWN OF SIMPSONVILLE GREENVILLE COUNTY, S.C. LATERAL SYSTEM SHEET NO. 3-A DWN J.G. CKD APPD JOB 20314 DATE FEB. 70 PIEDMONT ENGINEERS & ARCHITECTS 420 PARK AVE, GREENVILLE, S.C. Includes logo for P. Anderson, Registered Engineer, No. 772, South Carolina.