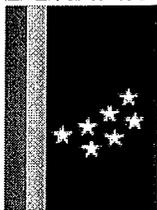


Scanned By	Date	DOC ID	Permit
Backus	07/08/2011	14325	32-12T

DURHAM



CITY OF DURHAM

Department of Solid Waste Management
101 CITY HALL PLAZA 27701
1833 CAMDEN AVENUE | DURHAM, NC 27704
919.560.4186 | F 919.560.1197

1 8 6 9
CITY OF MEDICINE

July 1, 2011

Ms. Pat Backus, P.E.
Environmental Engineer
Solid Waste Section – NCDENR
1646 Mail Service Center
Raleigh, NC 27699-1646

Re: Response to Comments-Application Review
City of Durham Transfer Station (Permit No. 32-12T)
Durham, North Carolina

Dear Ms. Backus,

The City of Durham has prepared this response to the comments provided in correspondence dated February 18, 2011 (SWS-Doc ID No. 12981). The following responses address each comment and reference any revisions to the application submitted on February 17, 2011. For comprehension purposes, the comments are stated below in *italics* preceding the City's response.

Comment No. 1

Please indicate specifically where on site the shingles will be collected and the approximate dimensions of the area. Will the shingles be unloaded onto a concrete pad or the ground?

Response No. 1

Figure 1 has been added to the application to show the exact location of the shingle handling area. The shingles will be unloaded onto the lower concrete pad (the same level that the roll-off boxes are located). City equipment will be utilized to load the roll-off containers for transport to processor. The section below has been added to the application:

Location and Size of Separation Area

All shingles will be handled on the lower concrete pad area adjacent to the residential hand unloading containers. The exact location is identified as Location B on the attached Figure 1. The approximate area dimensions are: 30 feet X 20 feet.

Comment No. 2

Please describe what the attendant will do to ensure that only recyclable shingle materials are sent to GreenCycle. Based on the acceptance criteria of GreenCycle (Page 6, 3A), only shingles that have been sorted to remove deleterious materials will be accepted. GreenCycle does not have a solid waste permit that would allow waste sorting; therefore, it has to be done by transfer station personnel.

Response No. 2

The City of Durham has an attendant that works at the convenience site to direct customers to the proper roll-off container for placement of their material. The following has been added to the application:

Attendant:

Attendant on duty will ensure that only shingles that adhere to the operations plan are segregated and collected in the recycling contain by constant monitoring. If the shingles do not meet the specified sorting parameters; they will be discarded as normal at the tipping floor for disposal.

Any de minimis amounts of deleterious or discard materials that may be delivered to GreenCycle will be processed per the signed agreement attached.

Comment No. 3

I am assuming that you will be required to complete the supplier form in the GreenCycle procedure (Page 17). It includes a list of certifications made by signing the form and requires a list of each residential address where the tear-off shingles were obtained. The proposed transfer procedure does not indicate how you will collect the necessary information.

Response No. 3

The City of Durham will not imply or certify, either verbally or in written form, that any shingles received for this pilot program are asbestos free. Certification of shingles is solely the responsibility of GreenCycle who will do all testing related to asbestos certification at their facility once the shingles collected at the Transfer Station are delivered to them. The referenced supplier form (Page 17) is in Appendix C of the GreenCycle Operations Plan. Appendix C only refers to loads of shingles that may be directly hauled to the GreenCycle facility from contractors that have already tested for asbestos. According to the GreenCycle Operations Plan, "If loads of post-consumer asphalt roofing shingles enter the facility from a non-regulated facility and no asbestos survey is supplied at the time of intake, then the material will be tested by a NC accredited asbestos inspector. This includes loads from Solid Waste Landfills, which do not have a process in place to screen asbestos-containing materials."

Comment No. 4

The application did not include the Pilot Shingle Program agreement mentioned; therefore I was unable to determine if it addressed the questions listed.

Response No. 4

The proposed Service Agreement for Conducting a Shingle Recycling Program between the City of Durham and GreenCycle Materials, LLC is included with this submittal as Attachment 2.

We have also included an additional part in this modification. Liquid drainage from the tipping floor has not drained properly due to excessive wear on the trench drain covers and clogging by debris. An improvement to the trench drain has been designed by Clough Harbour and Associates (CHA). This design work also includes an update to the drain on the exit ramp leaving the front of the building and an update to the oil/water separator. The design documents are included as Attachment 3 to the Permit Modification request.

Should you have any questions or require clarification, please contact me at your earliest convenience at (919)-560-4186.

Sincerely,



Chris Marriott, Disposal Manager
CITY OF DURHAM
SOLID WASTE MANAGEMENT

ATTACHMENTS



Permit Modification

City of Durham

Solid Waste Transfer Station

February 10, 2011
Revised June 27, 2011

Solid Waste Director, Donald Long

Solid Waste Department

101 City Hall Plaza

Durham, NC 27704

919-560-4186

Facility Permit #: 32-12T
Type of facility: Solid Waste Transfer Station
Location: 2115 E Club Blvd. Durham, NC 27704

1.0

We are requesting a modification to our transfer station permit that was originally issued December 9, 1997 and was last amended on April 4, 2010. All portions of the existing operation plan will continue to be in effect. This document will be an appendix to the existing plan and outlines a shingle recycling operation that will occur at the same location.

This document also updates the emergency contact personnel for facility operations.

2.0

Proposed Shingle Recycling segregation and transport

The City currently landfills all shingle material brought into the facility by all customers. In order to reduce the amount of shingle material placed into the waste stream; the City would like to modify its current permit to allow for the collection/segregation of post consumer (tear off) shingles. The planned start date for this program is **September 1, 2011**.

The City will collect the shingles from our customers in a segregated area, load the materials, and haul them to GreenCycle Materials, LLC located at 1419 Camden Avenue Durham, NC 27704 which is approximately 1.5 miles from the transfer station location.

The tipping floor will also continue to receive shingles that are mixed with trash and cannot be segregated as currently outlined in our operations plan.

The tonnage of shingles transported to GreenCycle will be tracked for record keeping and data reporting purposes.

City staff attendants will ensure that only “clean shingle” waste is segregated and that no trash or other materials will be included in with the recyclable shingle materials to be transported.

At the completion of the daily routine; all shingle related materials will transported to the GreenCycle or stored in their respective bins.

Expected Tonnage

For the entire year of 2010, the City received 3,813 tons of shingles. We anticipate removing 40 to 50 percent of that figure from the waste stream by recycling the clean shingle materials.

Location and Size of Separation Area

All shingles will be handled on the lower concrete pad area adjacent to the residential hand unloading containers. The exact location is identified as Location B on the attached Figure 1. The approximate area dimensions are: 30 feet X 20 feet.

Attendant:

Attendant on duty will ensure that only shingles that adhere to the operations plan are segregated and collected in the recycling contain by constant monitoring. If the shingles do not meet the specified sorting parameters; they will be discarded as normal at the tipping floor for disposal. Any deleterious or discard materials that may be delivered to GreenCycle will be processed per the signed agreement attached.

Approved Operation Plan for asbestos testing

GreenCycle has an approved Operations Plan from the North Carolina Department of Health and Human Services-Health Hazards Control Unit for the screening for asbestos testing. The GreenCycle Operations Plan is included as Attachment 1. The City of Durham will not be responsible for asbestos testing. GreenCycle will solely be responsible for testing of asbestos once the shingles are transported to GreenCycle's location.

Length of service and use

The City anticipates this program to run for a six (6) month period. After that; the City will evaluate the program and may choose to continue the program for an additional year. The City or GreenCycle may sever the partnership with due notice as noted in the Pilot Shingle Program agreement. Also, GreenCycle will report to the City exactly how the recycled shingle materials were used. The agreement document is included as Attachment 2 to this submittal.

3.0

Trench drain improvement & repairs

Due to the wear and tear on the trench drain covers and surrounding areas inside of the tipping floor building; repairs will be necessary to correct these issues. Therefore the design of the trench drain has been changed. The new design drawings related to this renovation are attached for review.

End Of Modification

Revised Emergency Contacts on the Next Page

EMERGENCY CONTACT INFORMATION

City of Durham Transfer Station, Facility ID # 32-12T

2115 E Club Blvd. Durham, NC 27704

Updated 02/10/11

Responsible agency: Solid Waste Management Department
Mailing address: 101 City Hall Plaza, Durham, NC 27701
Physical address: 1833 Camden Ave, Durham, NC 27704
Main phone line: 919-560-4186

City Staff - Primary Contacts

Emergency coordinators, listed in the order they should be contacted.

Chris Marriott, Disposal Manager Email: chris.marriott@durhamnc.gov
Office: 919-560-4186 ext 32253; cell: 919-452-2804

Bruce Woody, Assistant Disposal Manager email: Bruce.Woody@durhamnc.gov
Office: 919-560-4186 ext 32228; cell: 336-504-2323; home: 336-504-2323

Donald Long, Director email: Donald.Long@durhamnc.gov
Office: 919-560-4186 ext 32222; cell: 919-201-0258; home: 919-957-0234

Robert Williams, Assistant Director Email: Robert.Williams@durhamnc.gov
Office: 919-560-4186 ext 32224; cell: 919-201-3483 home: 919-381-4613

All above City of Durham Solid Waste Management employees are located at the following address: 1833 Camden Ave., Durham, NC 27704

Operating Contractor – Primary Contacts

Dan Jarboe, Durham Terminal Manager email: dan.jarboe@mrbults.com
MBI, cell: (708) 243-7270

Rick Prather, Republic Services email: Rick.Prather@awin.com
5111 Chin Page Rd, Durham NC, 27703
office: 919-433-0901 cell: 919-669-3696

FIGURE 1

Legend for Figure 1

Figure 1 is an aerial photograph of the City of Durham Transfer Station property.

Location A – Scale house for transfer station

Location B – Area for shingle recycling at the small vehicle customer convenience center.

Location C – The transfer station building.

Location D – Entrance to the facility from East Club Blvd.



ATTACHMENT 1
(GreenCycle Operations Plan)



P.O. Box 80697
Raleigh, NC 27623
Phone: 919-961-3355
Fax: 919-869-1996

13 August 2010

Mr. Jeffrey W. Dellinger
N.C. Department of Health and Human Services
Health Hazards Control Unit
1912 Mail Service Center
Raleigh, N.C. 27699-1912

Dear Mr. Dellinger:

GreenCycle Materials, LLC (GreenCycle) proposes to enhance its current asphalt and concrete recycling operations by including post-consumer asphalt roofing shingles. These shingles will be processed into a form that can be utilized by the paving industry for inclusion into asphalt products. There are several environmental benefits to recycling asphalt roofing shingles, such as reduction in landfill waste due to recycling materials that are typically wasted and reduction in regional air pollution emissions by offsetting some fraction of the production of new asphalt binder by others. There are two challenges present when recycling asphalt roofing shingles. First, asphalt shingle, as delivered to for processing, may contain deleterious materials (e.g., metal, plastic, and wood). Second, some small fraction of asbestos may be present, though current research indicates that this risk is small. This letter presents GreenCycle's proposed operating plan which specifically addresses the procedures that will be used to provide Recycled Asphalt roofing Shingles (RAS) that meet or exceed all specifications and regulatory requirements.

1. GREENCYCLE'S FACILITY

GreenCycle operates an approximately 12-acre materials stockpile yard at 2410 West Clemmons Rd, Winston-Salem, NC (Fig. 1). The yard is used solely for processing post-consumer asphalt roofing shingles. The areas where shingle recycling is proposed to occur is shown in Figure 1, including the routing of raw materials onto the site, the partitioning of pre- and post-testing raw materials, and the stockpiling of processed product. Representative ground-level site photographs are shown in Appendix A.

GreenCycle operates another site that is an approximately 17-acre materials stockpile yard at 1419 Camden Ave, Durham, NC (Fig. 2). The yard is used to stockpile concrete and recycled asphalt product. The yard will accommodate the proposed shingle recycling operations with minimal change to existing operations. The area where shingle recycling is proposed to occur is currently part of the Recycled Asphalt Product (RAP) storage area. The facility includes a stormwater runoff detention pond that captures runoff from the site and prevents untreated runoff from reaching nearby surface waters.



Figure 1. Greencycle Materials Site at 2410 W. Clemmonsville Rd., Winston Salem, NC. The aerial is from 2005 and no longer reflects site conditions. The orange arrow indicates inbound traffic flow. The red line divides the site between processed material (green rectangle) and raw material (orange and blue rectangles). The orange rectangle represents shingle that have not been tested for ACM. The blue rectangle represents stockpiled shingles that have been tested for ACM are cleared for further processing. The pre- and post-testing materials are physically separated from one another by concrete barriers.

Source: Greencycle Materials 2010, GoogleEarth 2010



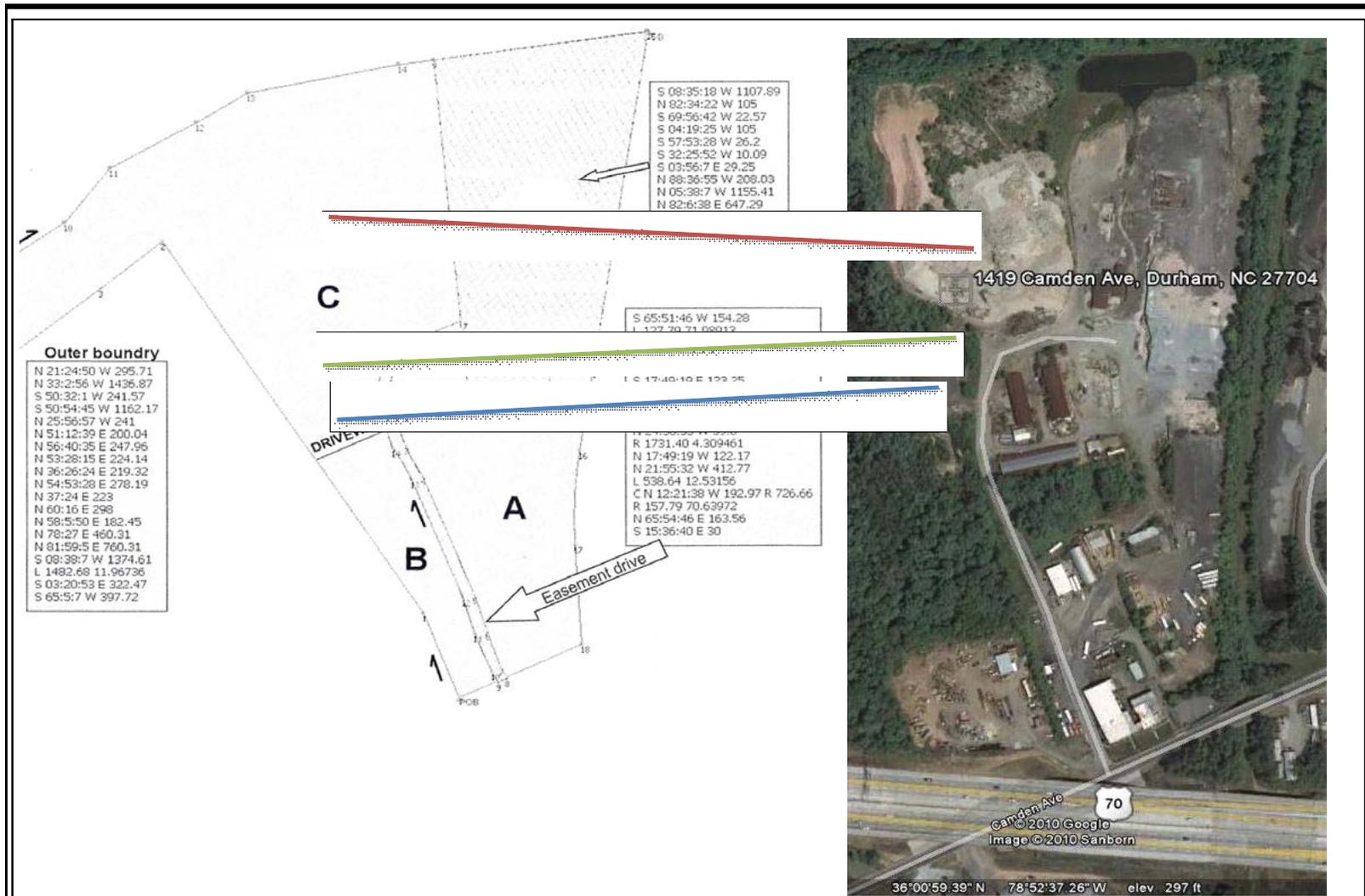
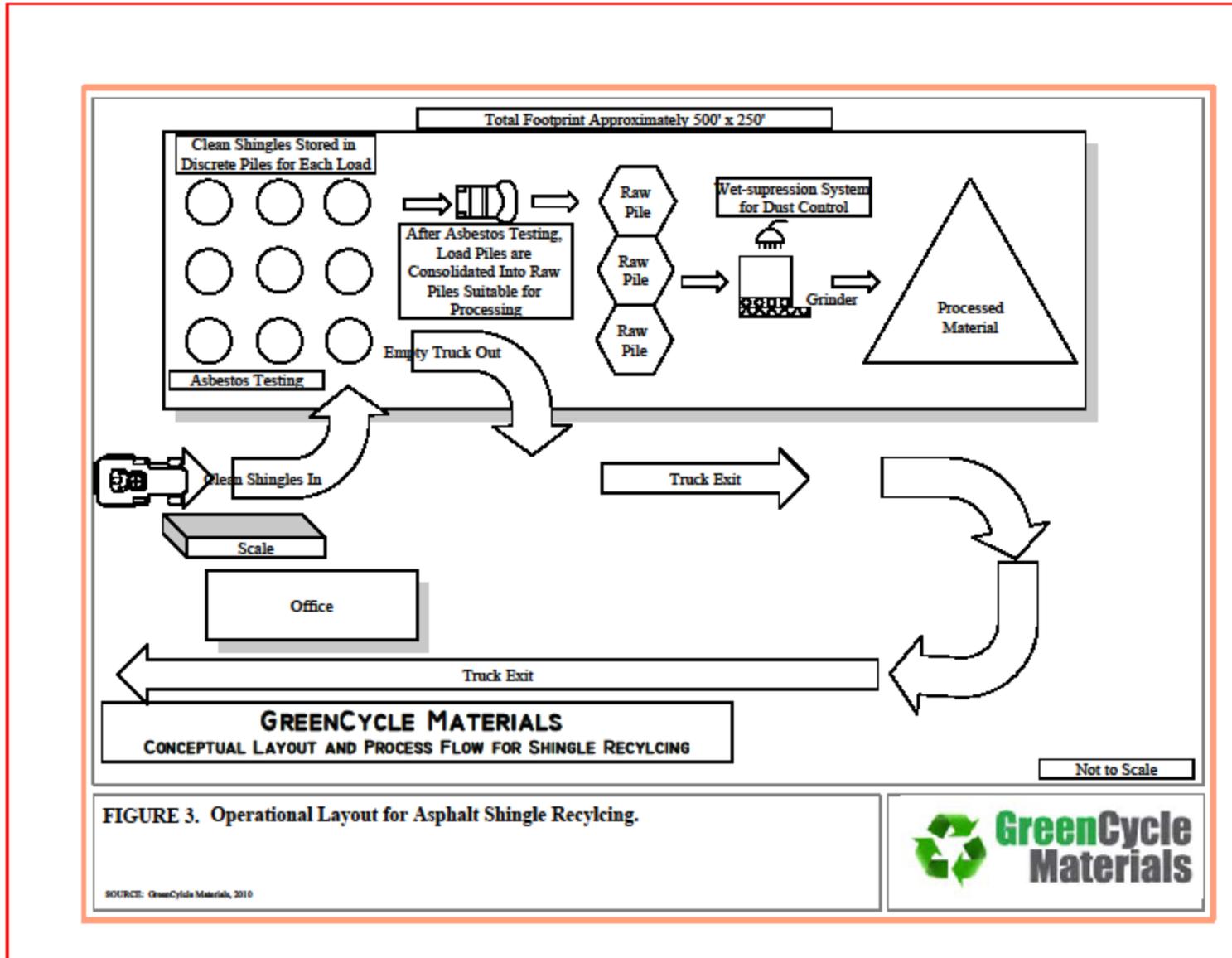


FIGURE 2. Plan and Aerial View of Coastal Materials Yard in Durham, NC. The blue line indicates area that is currently being used to stockpile RAP and will be converted to intaking raw asphalt shingles. The red line indicates stockpile are for processed materials. The green line indicates approximate location of shingle grinder.

Source: GreenCycle Materials, LLC; Google Earth 2009.





2. PROCESS DESCRIPTION

Shingles may be obtained from many sources (suppliers). Suppliers will qualitatively ensure that deleterious materials are excluded from the shingles supplied to GreenCycle (clean shingles). The certification form is shown in the Appendix. Clean shingles will be transported to GreenCycle's facility in single batches. Clean shingles from different sources will not be mixed. Figure 3 shows the diagrammatic layout and process flow for the shingle recycling operations described below.

Trucks hauling clean shingles will be inspected for deleterious materials and potentially asbestos containing material (ACM) when they enter the facility. Trucks entering the facility will be inspected primarily for deleterious materials. This intake inspector will not be responsible for conducting sampling or make visual determinations that asbestos is not present for the purpose of authorizing shingles to be ground. A second inspection will occur at the time that each load is dumped. This second inspection will be carried out by qualified asbestos personnel who have completed the five-day asbestos supervisor course and annual refresher training. This training will meet the NESHAP requirements and also meets the intent of the competent person under OSHA Asbestos in Construction Standard 1926.1101. The asbestos trained supervisor will have the knowledge and authority to determine if a load of asphalt roofing shingles is unacceptable and reject the load if necessary (competent person). If asbestos accidentally enters the process stream, then this asbestos trained supervisor, serving as the competent person, shall have the knowledge and authority to stop work as needed so that corrective action can be taken. A NC accredited asbestos inspector will visually inspect and sample each load of asphalt roofing shingles for asbestos to determine if the material is suitable for grinding.

Each truck load will be piled separately. The piles will not be comingled. Each pile will be visually inspected by a NC accredited asbestos inspector and quantitatively sampled according to the current ASTM standards and EPA test methods for asbestos concentration in bulk building materials prior to being approved for grinding. Samples will only be tested by a North Carolina accredited asbestos inspector. Only piles that do not contain asbestos will be approved for further processing. Rejected piles will be disposed of at a licensed facility. The North Carolina Asbestos Waste Shipment Record form is shown in the Appendix.

Clean shingle piles that pass the asbestos testing will be consolidated in to a stockpile of raw materials that are ready to be further processed into saleable product. Periodically, these raw materials will be processed by a shingle grinder. The shingle grinder and related process equipment uses a water spray as wet suppression for dust emissions. The process reduces the shingles into an aggregate that is less than ½ inch in diameter. This aggregate is the final product. The final product is stockpiled for bulk sale to asphalt producers (customers). All post-consumer asphalt roofing shingles which will be ground must contain less than 1% asbestos. Should material containing more than 1% asbestos be detected in the grinding feedstock, then operations would stop and the Health Hazards Control Unit would be contacted.

3. OPERATING PROCEDURES

The two main differences between processing shingles as opposed to RAP are the potential presence of deleterious materials and asbestos. Deleterious materials and asbestos must be removed from the process flow in order to avoid compliance issues with 40 CFR 61 Subpart M (National Emissions Standard for Hazardous Air Pollutants – Asbestos Standards; NESHAP), state and local regulations, and to meet the specifications of the American Association of State Highway Transportation Officials (AASHTO) Specification M2005ATS-2c. A list of acceptable and unacceptable materials is shown in the Appendix and suppliers will be awareness trained to these requirements. This includes no “Flat Built-up” roofing, asbestos cement products, asbestos painted shingles, or asbestos mastic painted shingles will be allowed.

Deleterious materials are typically construction debris that is being disposed of with the shingles. There is a possibility of deleterious materials being included with deliveries of shingle loads. Operating procedures that minimize the incorporation of deleterious materials into the final product are presented below.

Asbestos may be present in very old shingles, mastic, or roofing felt, et al. There is a low probability of asbestos being included with shingle loads. Asbestos is a hazardous material and is regulated under the EPA NESHAP Subpart M (40 CFR 61 Subpart M) and state and local regulations. The operating procedures for asbestos exclusion below are designed to eliminate ACM from GreenCycle’s processes.

A. MANAGEMENT OF DELETERIOUS MATERIALS

Shingles that are suitable for processing will be free of deleterious materials to the extent practicable. Examples of deleterious materials include wood, metal flashing, gutters, plastic wrap, buckets, paper waste or other garbage, trash or dirt.

GreenCycle anticipates that the primary source for shingles will be landfills and construction/demolition materials recycling facilities. Shingles from these sources will be “source sorted” to remove deleterious materials. A secondary source of shingles may be from roofing or hauling contractors. Shingles from these sources will be sorted onsite and the deleterious material will be removed from the load and disposed of in a landfill that is permitted to accept the materials.

Regardless of the source of the shingles, qualified GreenCycle personnel will inspect each incoming load. Source sorted loads will be stockpiled according to the procedure described below for asbestos testing.

1. Each load of shingles will be dumped in a discrete pile.
2. Each load will be inspected by qualified personnel at time of dumping for deleterious materials and ACM.
 - i. Qualified personnel may inspect incoming loads, but only a North Carolina accredited inspector may collect samples.

3. Acceptable loads that are source sorted shall contain only incidental deleterious material or they will be rejected.
4. Loads from construction activities must be sorted to obtain only incidental deleterious material and the waste properly disposed.

B. MANAGEMENT OF POTENTIALLY ASBESTOS CONTAINING MATERIAL

It is GreenCycle's intention to completely exclude ACM from entering the process flow. Therefore, only tear-off shingles from facilities at which NESHAP does not apply will be accepted. The supplier will be required to provide assurance that each load was generated at a non-regulated facility or provide pre-renovation ACM test results (Appendix). Alternatively, shingles may be obtained from solid waste facilities that are permitted to handle ACM materials and have their own procedures in place for screening for ACM. It is GreenCycle's intention to only accept post-consumer tear-off asphalt roofing shingles that originated at a residential site and that contain less than 1% ACM. GreenCycle will use qualified asbestos personnel to implement the procedures described below. Accredited labs will be used to test samples using approved methods.

All incoming loads will be inspected by qualified personnel. All loads will be sampled by a North Carolina accredited asbestos inspector unless documentation is supplied that verifies previous inspection (Appendix C). If loads of post-consumer asphalt roofing shingles enter the facility from a non-regulated facility and no asbestos survey is supplied at the time of intake, then the material will be tested by a NC accredited asbestos inspector. This includes loads from Solid Waste Landfills, which do not have a process in place to screen asbestos-containing materials.

In the unlikely event that ACM is inadvertently incorporated into the product (i.e., passed through the shingle grinder), then operations would cease, the material will be wetted and contained, and the Health Hazards Control Unit would be contacted for guidance.

1. Incoming loads of shingles will be accepted by qualified asbestos personnel trained to identify potential ACM and deleterious materials.
2. All loads of shingles shall be sampled and tested for ACM as follows:
 - a. Each load will be inspected, ticketed, and stockpiled separately in an assigned area. Stockpiles will be marked and placed in the order of arrival.
 - b. Representative samples will be collected from each load by a NC accredited asbestos inspector, unless they have been previously certified to contain less than 1% asbestos (Appendix C). The inspector will determine the number of samples to be collected based on color and homogenous material.
 - c. Samples will be sent to an accredited laboratory for testing for ACM using the polarized light method (PLM) analysis as the initial diagnostic procedure. The samples will be analyzed in accordance with the current ASTM and EPA sampling protocols and test methods.
 - d. Documentation of results will be recorded and maintained on site,
 - e. In the event that a sample is found to contain >1% ACM:

- i. The shingle pile will be rejected and will be disposed of in a landfill permitted to accept asbestos.
 1. For the Clemmonsville site, rejected materials will be transported to WCA, 5830 Riverdale Rc., Jamestown NC 27282.
 2. For the Durham site, rejected materials will be transported to WCA, 421 Raleigh View Rd., Raleigh NC 27610.
 - ii. Disposal documentation (North Carolina Asbestos Waste Shipment Record, Appendix) will be recorded and maintained on site.
3. Shingles shall be stored in a defined area to prevent mixing or contamination of the shingle pile prior to testing. Operation of the area shall include:
 - a. Access to the storage facility is controlled by a gated entrance and exit.
 - b. A sign will be posted at the entrance indicating the name and hours of operation.
 - c. Incoming loads will be inspected for unacceptable waste.
 - d. Storage and unloading of the shingles will be restricted to an approved designated area.
 - e. Storage of the shingles shall be a minimum of 100 feet from surface waters.
4. All recyclable material will be separated and delivered to a recycling facility. All non-recyclable material will be separated and stored in a roll-off container for disposal at a permitted landfill.
5. Sorting of shingles will be accomplished daily or for every 2,500 tons collected.

C. RECORD KEEPING

Record keeping and data collection will be an important aspect of this operation. The following records will, at a minimum, be maintained at each facility.

1. A copy of this operations plan.
2. Test results of the pre-processed shingles
3. Suppliers source certification forms
4. Amount of shingles accepted and rejected and the source from which they originated.
5. Customer sales by name, address, quantity of material sold, date, and product description.
6. Record of daily production of shingle grinder in total tons processed and the number of hours that the grinder was operated. Total daily throughput will be reported as tons per hour.
7. Asbestos Waste Shipment Records

GreenCycle appreciates your attention to this matter. We look forward to your approval of this operating plan. Please feel free to contact me with any questions regarding this request at srobertson@Greencyclematerials.com or (321) 626-9104.

Thank You,

A handwritten signature in black ink, appearing to read "S. Robertson Ph.D.", with a stylized flourish at the end.

Stirling Robertson, Ph.D.
EHS Director
GreenCycle Materials, LLC

Appendix A

1. Representative Ground-level Photos of the Clemmonsville Site







Appendix B

1. Expanded View of Durham Site Boundaries

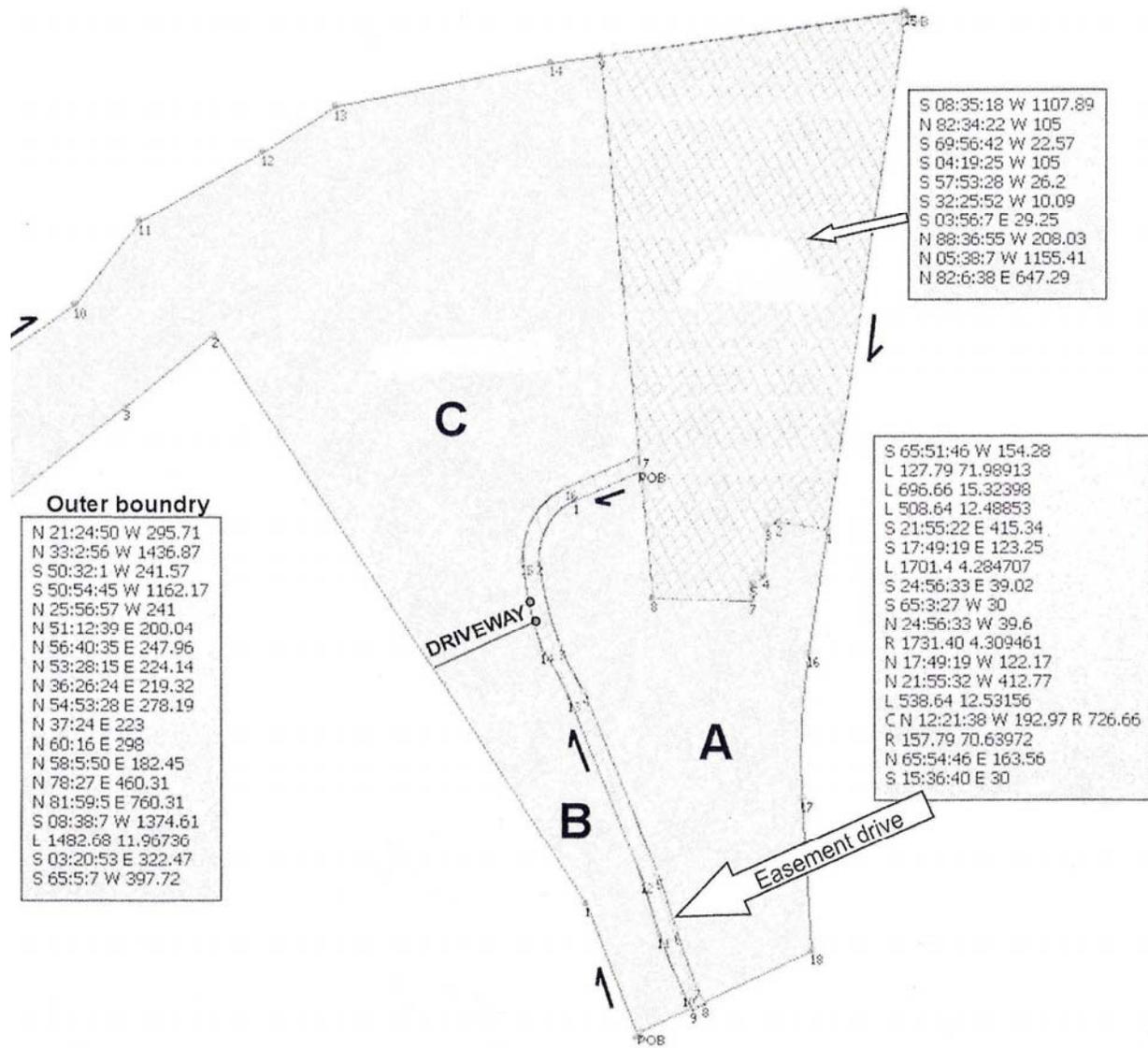


Figure B-1. Expanded View of Durham Facility Boundaries. Reproduced here because boundary coordinates are illegible in Figure 1.

Appendix C

1. Supplier Certification Form
2. North Carolina Asbestos Shipping Record Form
3. List of Acceptable and Unacceptable Materials for Suppliers

Roofing Company or Other Supplier of Whole Tear-Off Shingles

Delivery Company Name:

Address: _____

Contact: _____

Phone: _____

E-mail: _____

We the undersigned, certify that:

1. All tear-off shingle scrap came from residential buildings having four or fewer dwelling units (see addresses below or attached);
2. These residential buildings are not “regulated facilities” according to state and federal NESHAP rules; and
3. The roofing waste material delivered consists of asphalt roofing shingles and normal roofing debris only and contains no known hazardous material (e.g., asbestos).
4. Attach certification from a North Carolina accredited asbestos inspector that certifies that this load contains less than 1% asbestos.

Residential re-roof customer address(es) where the tear-off shingle scrap originated:

(Please attach additional sheets as needed to record each customer address)

Name and address of processor where the shingle scrap was supplied to:

Tear – Off shingles supplier: **Signature**

Date

NORTH CAROLINA ASBESTOS WASTE SHIPMENT RECORD

1. Waste Generator/Owner Name and Address:		Work Site Name and Physical Address:		Waste Generator/Owner Phone Number:	
2. Contractor Name and Address:			Contractor Phone Number:		
3. Waste Disposal Site (WDS) Name, Mailing Address:		WDS Physical Site Location:		WDS Phone Number:	
		NC Landfill Permit #:			
4. Name of Responsible Agency:					
<input type="checkbox"/> Forsyth Co. Environmental Affairs Dept. <input type="checkbox"/> Mecklenburg Co. Dept. of Environmental Protection <input type="checkbox"/> NC DHHS - Health Hazards Control Unit <input type="checkbox"/> WNC Regional Air Pollution Control Agency		Permit #: _____		NEBMAP (ACTS) ID #: _____	
		Start Date: _____		Complete Date: _____	
5. Description of materials:					
6. Containers: Number: _____		Vehicle: _____		7. Total Quantity (yd ³): _____	
Type: _____		RQ, ASBESTOS, CLASS 9 NA 2212, III			
8. Special Handling Instructions and Additional Information:					
EMERGENCY CONTACT: DIVISION OF EMERGENCY MANAGEMENT AT 1-800-858-0368					
9. CONTRACTOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.					
Printed/Typed Name & Title: _____					
Signature: _____				Date (MM/DD/YYYY): _____	
10. Transporter 1 (Acknowledgment of Receipt of Materials):					
Printed/Typed Name & Title: _____					
Address: _____			Phone Number: _____		
Signature: _____				Date (MM/DD/YYYY): _____	
11. Transporter 2 (Acknowledgment of Receipt of Materials):					
Printed/Typed Name & Title: _____					
Address: _____			Phone Number: _____		
Signature: _____				Date (MM/DD/YYYY): _____	
12. Discrepancy Indication Space:					
13. Waste Disposal Site: _____ Owner or Operator Certification of Receipt of Asbestos Materials Covered by this Manifest, Except as Noted in Item #12.					
Printed/Typed Name & Title: _____				Total Weight (Tons): _____	
Signature: _____				Date (MM/DD/YYYY): _____	

DPHS 3787 (Revised 8/99)
 Health Hazards Control Unit

[1 copy- Waste Generator/Owner; 1 copy- Contractor; 1 copy - Transporter; 1 copy - Disposal Site; 1 copy - Health Hazards Control Unit]

Acceptable and Unacceptable Materials from Shingle Suppliers

This facility will not accept any material that contains more than 1% asbestos. Inspections and tests are required for all loads.

“YES”

Include these items:

- Shingles
- Felt attached to shingles

“NO”

Do NOT include these items:

- Asbestos
- Wood
- Metal flashings, gutters, etc
- Nails (best effort)
- Plastic wrap, buckets
- Paper waste
- Other garbage, trash or dirt

ATTACHMENT 2
(GreenCycle-Durham Pilot Shingle Program Agreement)

**STATE OF NORTH CAROLINA
CITY OF DURHAM**

**SERVICE AGREEMENT FOR CONDUCTING A SHINGLE RECYCLING PROGRAM BETWEEN
THE CITY OF DURHAM and GREENCYCLE MATERIALS, LLC**

This contract is dated, made, and entered into as of the 2nd day of June, 2011, by the City of Durham (“City”) and [GreenCycle Materials], LLC (“Contractor”).

Sec. 1. Background and Purpose. To conduct a shingle recycling pilot program.

Sec. 2. Services and Scope to be Performed. Presumption that Duty is Contractor’s. In this contract, “Work” means the services that the Contractor is required to perform pursuant to this contract and all of the Contractor’s duties to the City that arise out of this contract as outlined in Attachment A titled “Scope of Work”. Unless the context requires otherwise, if this contract states that a task is to be performed or that a duty is owed, it shall be presumed that the task or duty is the obligation of the Contractor.

Sec. 3. Reserved.

Sec. 4. Complete Work without Cost. Except to the extent otherwise specifically stated in this contract, the Contractor shall obtain and provide, without additional cost to the City, all labor, materials, equipment, transportation, facilities, services, permits, and licenses necessary to perform the Work.

Sec. 5. Contractor’s Billings to City. Compensation. The Contractor will not invoice the City.

The City shall pay the Contractor for the Work as follows: This is a no cost contract. The City shall not be obligated to pay the Contractor any payments, fees, expenses, or compensation.

Sec. 6. Reserved

Sec. 7. Insurance.

Contractor shall maintain insurance not less than the following:

Commercial General Liability, covering

- premises/operations,
- products/completed operations; this coverage shall be maintained for 6 years following the date of acceptance of the completed building by the City,
- broad form property damage,
- explosion, collapse, and underground hazards if the hazards exist in the performance of this contract,
- contractual liability
- independent Contractors, if any are used in the performance of this contract,
- City of Durham must be named additional insured, and an original of the endorsements to effect the coverage must be attached to the certificate (if blanket endorsements, then agent may so indicate in the GL section, in lieu of an original endorsement), and
- combined single limit not less than \$2,000,000 per occurrence; aggregate limit not less than \$2,000,000 per year.

Automobile Liability Insurance, covering

- owned, hired, and non-owned vehicles
- employee-non-ownership
- MCS-90 endorsement for transportation of hazardous materials, where applicable combined single limit not less than \$1,000,000 per accident; aggregate limit not less than \$2,000,000.

City of Durham must be named additional insured, and an original of the endorsement to effect the coverage must be attached to the certificate (if by blanket endorsement, then agent may so indicate in the GL section of the certificate, in lieu of an original endorsement)

Sec. 8. Performance of Work by City. If the Contractor fails to perform the Work in accordance with the schedule referred to in section 2 above, the City may, in its discretion, in order to bring the project closer to the schedule, perform or cause to be performed some or all of the Work, and in doing so shall not waive any of the City’s rights and remedies. Before doing so, the City shall give the Contractor notice of its intention. The

Contractor shall reimburse the City for additional costs incurred by the City in exercising its right to perform or cause to be performed some or all of the Work pursuant to this section.

Sec. 9. Exhibits. The following exhibits are made a part of this contract: None

Sec. 10. Notice. (a) All notices and other communications required or permitted by this contract shall be in writing and shall be given either by personal delivery, fax, UPS, Federal Express, or certified United States mail, return receipt requested, addressed as follows. The parties are requested to send a copy by email.

To the City:

Donald Long, Director Solid Waste Management
City of Durham
101 City Hall Plaza
Durham, NC 27701-3329
The telephone number is: (919) 560-4186, ext. 32224
The fax number is (919) 560-1132
Email: Donaldt.Long@durhamnc.gov

To the Contractor:

Mike Skubic, President
GreenCycle Materials, LLC
P. O. Box 80607
Raleigh, NC 27622J
The telephone number is: (919) 601-1041
The fax number is (919) 867-1996
Email: mskubic@greencyclmaterials.com

(b) Change of Address. Date Notice Deemed Given. A change of address, fax number, or person to receive notice may be made by either party by notice given to the other party. Any notice or other communication under this contract shall be deemed given and sent at the time of actual delivery, if it is personally delivered or sent by fax. If the notice or other communication is sent by United States mail, it shall be deemed given upon the third calendar day following the day on which such notice or other communication is deposited with the United States Postal Service or upon actual delivery, whichever first occurs.

Sec. 11. Indemnification. (a) To the maximum extent allowed by law, the Contractor shall defend, indemnify, and save harmless Indemnitees from and against all Charges that arise in any manner from, in connection with, or out of this contract as a result of acts or omissions of the Contractor or subcontractors or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. In performing its duties under this subsection "a," the Contractor shall at its sole expense defend Indemnitees with legal counsel reasonably acceptable to City. (b) Definitions. As used in subsections "a" above and "c" below -- "Charges" means claims, judgments, costs, damages, losses, demands, liabilities, duties, obligations, fines, penalties, royalties, settlements, and expenses (included without limitation within "Charges" are (1) interest and reasonable attorneys' fees assessed as part of any such item, and (2) amounts for alleged violations of sedimentation pollution, erosion control, pollution, or other environmental laws, regulations, ordinances, rules, or orders -- including but not limited to any such alleged violation that arises out of the handling, transportation, deposit, or delivery of the items that are the subject of this contract). "Indemnitees" means City and its officers, officials, independent contractors, agents, and employees, excluding the Contractor. (c) Other Provisions Separate. Nothing in this section shall affect any warranties in favor of the City that are otherwise provided in or arise out of this contract. This section is in addition to and shall be construed separately from any other indemnification provisions that may be in this contract. (d) Survival. This section shall remain in force despite termination of this contract (whether by expiration of the term or otherwise) and termination of the services of the Contractor under this contract. (e) Limitations of the Contractor's Obligation. If this section is in, or is in connection with, a contract relative to the design, planning, construction, alteration, repair or maintenance of a building, structure, highway, road, appurtenance or appliance, including moving, demolition and excavating connected therewith, then subsection "a" above shall not require the Contractor to indemnify or hold harmless Indemnitees against liability for damages arising out of bodily injury to persons or damage to property proximately caused by or resulting from the negligence, in whole or in part, of Indemnitees.

Sec. 12. Miscellaneous

(a) Choice of Law and Forum; Service of Process. (i) This contract shall be deemed made in Durham

County, North Carolina. This contract shall be governed by and construed in accordance with the law of North Carolina. The exclusive forum and venue for all actions arising out of this contract shall be the North Carolina General Court of Justice, in Durham County. Such actions shall neither be commenced in nor removed to federal court. This subsection (a) shall not apply to subsequent actions to enforce a judgment entered in actions heard pursuant to this subsection. (ii) If the Contractor is not a natural person (for instance, the Contractor is a corporation or limited liability company), this subsection (ii) applies. "Agent for Service of Process" means every person now or hereafter appointed by the Contractor to be served or to accept service of process in any State of the United States. Without excluding any other method of service authorized by law, the Contractor agrees that every Agent for Service of Process is designated as its non-exclusive agent for service of process, summons, and complaint. The Contractor will instruct each Agent for Service of Process that after such agent receives the process, summons, or complaint, such agent shall promptly send it to the Contractor. This subsection (ii) does not apply while the Contractor maintains a registered agent in North Carolina with the office of the N. C. Secretary of State and such registered agent can be found with due diligence at the registered office.

(b) Waiver. No action or failure to act by the City shall constitute a waiver of any of its rights or remedies that arise out of this contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

(c) Performance of Government Functions. Nothing contained in this contract shall be deemed or construed so as to in any way estop, limit, or impair the City from exercising or performing any regulatory, policing, legislative, governmental, or other powers or functions.

(d) Severability. If any provision of this contract shall be unenforceable, the remainder of this contract shall be enforceable to the extent permitted by law.

(e) Assignment, Successors and Assigns. Without the City's written consent, the Contractor shall not assign (which includes to delegate) any of its rights (including the right to payment) or duties that arise out of this contract. The City Manager may consent to an assignment without action by the City Council. Unless the City otherwise agrees in writing, the Contractor and all assignees shall be subject to all of the City's defenses and shall be liable for all of the Contractor's duties that arise out of this contract and all of the City's claims that arise out of this contract. Without granting the Contractor the right to assign, it is agreed that the duties of the Contractor that arise out of this contract shall be binding upon it and its heirs, personal representatives, successors, and assigns.

(f) Compliance with Law. In performing all of the Work, the Contractor shall comply with all applicable law.

(g) Notice of City Policy. THE CITY OPPOSES DISCRIMINATION ON THE BASIS OF RACE AND SEX AND URGES ALL OF ITS CONTRACTORS TO PROVIDE A FAIR OPPORTUNITY FOR MINORITIES AND WOMEN TO PARTICIPATE IN THEIR WORK FORCE AND AS SUBCONTRACTORS AND VENDORS UNDER CITY CONTRACTS.

(h) EEO Provisions. During the performance of this Contract the Contractor agrees as follows: (1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, political affiliation or belief, age, or handicap. The Contractor shall take affirmative action to insure that applicants are employed and that employees are treated equally during employment, without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or handicap. Such action shall include but not be limited to the following: employment, upgrading, demotion, transfer, recruitment or advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices setting forth these EEO provisions. (2) The Contractor shall in all solicitations or advertisement for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or handicap. (3) The Contractor shall send a copy of the EEO provisions to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding. (4) In the event of the Contractor's noncompliance with these EEO provisions, the City may cancel, terminate, or suspend this contract, in whole or in part, and the City may declare the Contractor ineligible for further City contracts. (5) Unless exempted by the City Council of the City of Durham, the Contractor shall include these EEO provisions in every purchase order for goods to be used in performing this contract and in every subcontract related to this contract so that these EEO provisions will be binding upon such subcontractors and vendors.

(i) SDBE. The Contractor shall comply with all applicable provisions of Article III of Chapter 18 of the Durham City Code (Equal Business Opportunities Ordinance), as amended from time to time. The failure of the Contractor to comply with that article shall be a material breach of contract which may result in the rescission or termination of this contract and/or other appropriate remedies in accordance with the provisions of that article, this contract, and State law. The Participation Plan submitted in accordance with that article is binding on the

Contractor. Section 18-59(f) of that article provides, in part, "If the City Manager determines that the Contractor has failed to comply with the provisions of the Contract, the City Manager shall notify the Contractor in writing of the deficiencies. The Contractor shall have 14 days, or such time as specified in the Contract, to cure the deficiencies or establish that there are no deficiencies." It is stipulated and agreed that those two quoted sentences apply only to the Contractor's alleged violations of its obligations under Article III of Chapter 18 and not to the Contractor's alleged violations of other obligations.

(j) No Third Party Rights Created. This contract is intended for the benefit of the City and the Contractor and not any other person.

(k) Principles of Interpretation and Definitions. (1) The singular includes the plural and the plural the singular. The pronouns "it" and "its" include the masculine and feminine. References to statutes or regulations include all statutory or regulatory provisions consolidating, amending, or replacing the statute or regulation. References to contracts and agreements shall be deemed to include all amendments to them. The words "include," "including," etc. mean include, including, etc. without limitation. (2) References to a "Section" or "section" shall mean a section of this contract. (3) "Contract" and "Agreement," whether or not capitalized, refer to this instrument. (4) "Duties" includes obligations. (5) The word "person" includes natural persons, firms, companies, associations, partnerships, trusts, corporations, governmental agencies and units, and other legal entities. (6) The word "shall" is mandatory. (7) The word "day" means calendar day. (8) The word "Work" is defined in Section 2. (9) A definition in this contract will not apply to the extent the context requires otherwise.

(l) Modifications. Entire Agreement. A modification of this contract is not valid unless signed by both parties and otherwise in accordance with requirements of law. Further, a modification is not enforceable against the City unless it is signed by the City Manager, a deputy or assistant City Manager, or, in limited circumstances, a City department director. This contract contains the entire agreement between the parties pertaining to the subject matter of this contract. With respect to that subject matter, there are no promises, agreements, conditions, inducements, warranties, or understandings, written or oral, expressed or implied, between the parties, other than as set forth or referenced in this contract.

(m) City's Manager's Authority. To the extent, if any, the City has the power to suspend or terminate this contract or the Contractor's services under this contract, that power may be exercised by City Manager or a deputy or assistant City Manager without City Council action.

Sec. 13. Termination for Convenience ("TFC"). (a) *Procedure.* Without limiting any party's right to terminate for breach, the parties agree that the City may, without cause, and in its discretion, terminate this contract for convenience by giving the Contractor written notice that refers to this section. TFC shall be effective at the time indicated in the notice. (b) *Obligations.* Upon TFC, all obligations that are still executory on both sides are discharged except that any right based on prior breach or performance survives, and the indemnification provisions and the section of this contract titled Trade Secrets and Confidentiality, if any, shall remain in force. At the time of TFC or as soon afterwards as is practical, the Contractor shall give the City all Work, including partly completed Work. In case of TFC, the Contractor shall follow the City's instructions as to which subcontracts to terminate. (c) *Payment.* The City shall pay the Contractor an equitable amount for the costs and charges that accrue because of the City's decisions with respect to the subcontracts, but excluding profit for the Contractor. Within 20 days after TFC, the City shall pay the Contractor one hundred dollars as a TFC fee and shall pay the Contractor for all Work performed except to the extent previously paid for. Work shall be paid for in accordance with the method (unit prices, hourly fees, etc.) to be used for payment had the Work been completed except to the extent it would be inequitable to either party, and if Work was to be paid for on a lump-sum basis, the City shall pay the part of the lump sum that reflects the percentage of completion attained for that Work. The Contractor shall not be entitled to any payment because of TFC except as stated in this section, whether on the basis of overhead, profit, damages, other economic loss, or otherwise.

Sec. 14. Trade Secrets; Confidentiality. The request for proposals (RFP) section titled "Trade Secrets and Confidentiality" shall apply to any Trade Secrets disclosed to the City during the process leading to the parties' entering into this Contract (including all of the Contractor's responses to the RFP). This section (titled "Trade Secrets; Confidentiality") shall remain in force despite termination of this contract (whether by expiration of the term or otherwise) and termination of the services of the Contractor under this contract. For purposes of this contract, the word "candidate" in the RFP section just cited shall mean the "Contractor."

IN WITNESS WHEREOF, the City and the Contractor have caused this contract to be executed under seal themselves or by their respective duly authorized agents or officers.

GreenCycle Materials, LLC

By:

Manager

Date _____

ATTEST:

CITY OF DURHAM

By:

Date _____

Attachment A

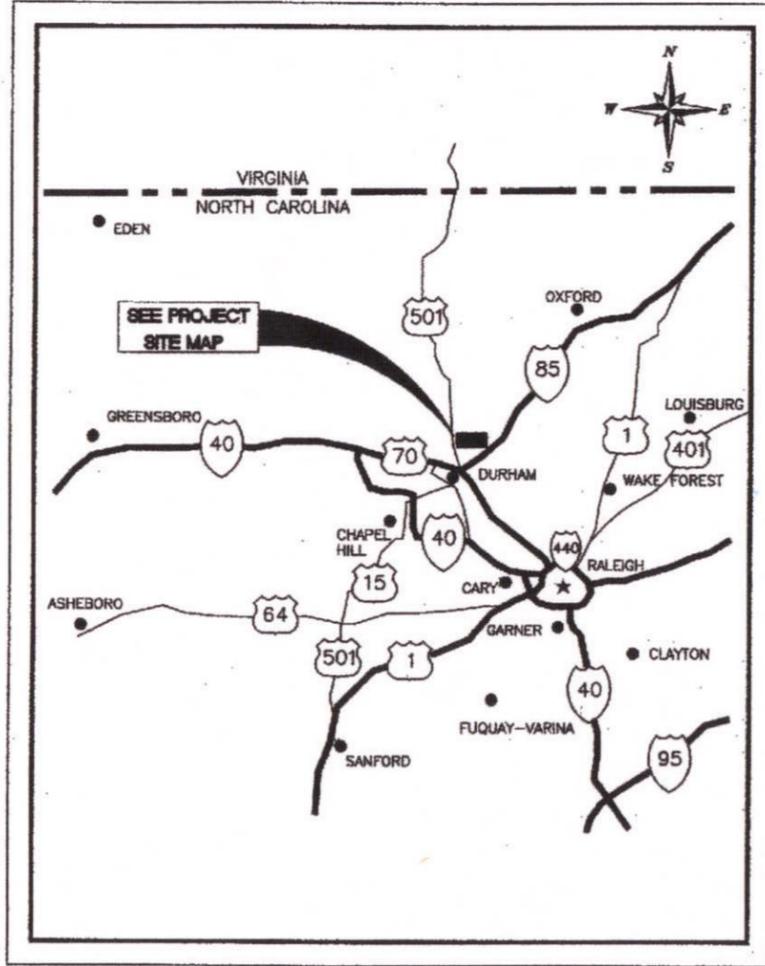
Scope of Work

The Contractor shall conduct a six-month pilot program for shingle recycling. The City will provide a dedicated container, to be placed at the City of Durham Transfer Station Convenience Center. The City of Durham will transport the container to the Contractor Monday through Friday, between the hours of 8:00 am and 4:00 pm. If the Contractor finds any materials other than shingles (“Discards”), the City shall be notified. Upon notification, the Contractor may bring the Discards to the Transfer Station and have the tipping fees waived. The Contractor shall be responsible for transporting any Discards, including the costs associated with transporting them.

Reporting. At the end of the six-month pilot period, and for every six months thereafter that the program continues, the Contractor shall report to the City the following information: (1) tonnage of the shingles delivered to the Contractor by the City, and (2) use of the shingles delivered to the Contractor by the City.

Asbestos Certification. The City of Durham will not imply or certify, either verbally or in written form, that any shingles received for this pilot program is asbestos free. This certification is solely the responsibility of GreenCycle who will do all testing related to asbestos certification at their facility once the shingles are delivered.

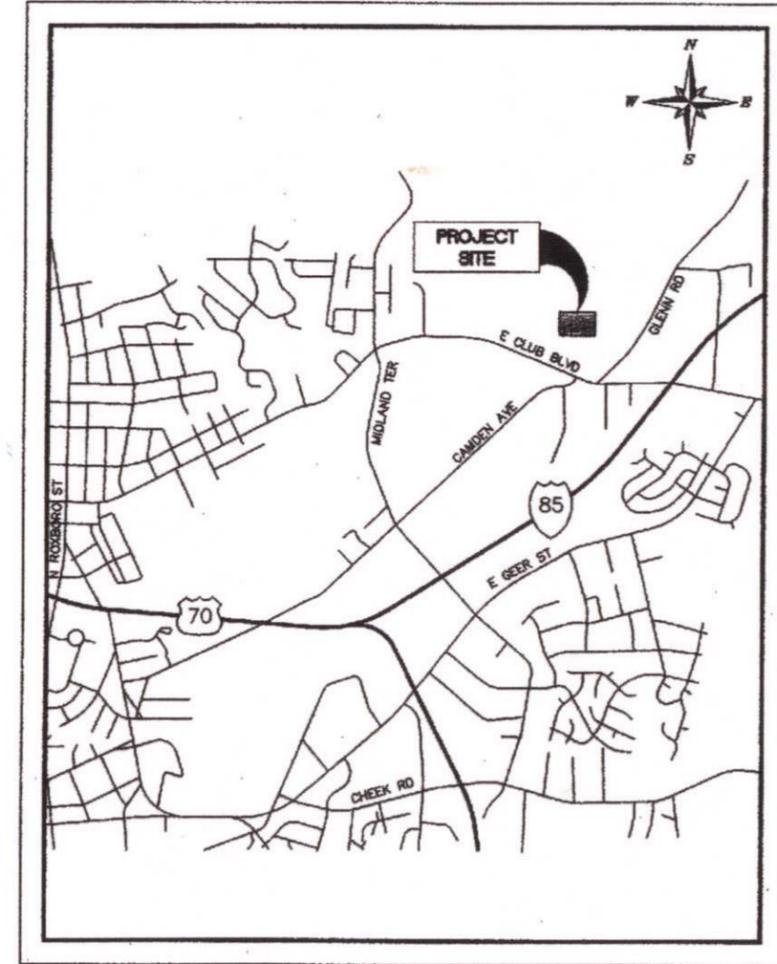
At the end of six months, the pilot program will be evaluated for possible continuation or expansion. The City may choose to continue the program for an additional one-year period by having the City Manager or his designee send a written request to GreenCycle Materials, LLC. Either party can cancel the program during the pilot period or during the one-year renewal term by presenting notice in writing to the other party no fewer than thirty (30) days in advance of the termination date.



NOT TO SCALE

PROJECT LOCATION

DRAWING INDEX	
SHEET NO.	DESCRIPTION
GENERAL	
G1	TITLE AND INDEX SHEET
G2	LEGENDS AND ABBREVIATIONS
G3	NOTES
C1	SITE DEMOLITION & EROSION CONTROL PLAN
C2	PROPOSED SITE PLAN
C3	OIL/WATER SEPARATOR REHAB PLAN & SECTION
C4	CAST-IN-PLACE CONCRETE SLAB DETAILS
C4A	PRECAST CONCRETE PAVING SLAB DETAILS



NOT TO SCALE

PROJECT SITE

CITY OF DURHAM TRANSFER STATION RENOVATION

No.	Submission / Revision	App'd By	Date
1	BID ISSUE	RCS	5/12/11
2	BID ISSUE REVISED	RCS	6/8/11

CITY OF DURHAM, NC



CH2M HILL
 1135 Kildine Farm Road, Suite 200 - Cary, NC 27511-4877
 Main: (919) 667-6222 • www.ch2mhill.com
 NC Engineering License F-1165
 Designated: GTS | Drawn: MIMCCH | Checked: JSR

TRANSFER STATION RENOVATION
 TITLE AND INDEX SHEET
 Issue Date: 5/6/11 | Project No.: 22714 | Scale: AS SHOWN

G1

DIVISION 1 – TRAFFIC CONTROL

- 1.1 GENERAL
 - A. THE CONTRACTOR SHALL FOLLOW THE CONSTRUCTION PROCEDURE AND MAINTENANCE OF TRAFFIC AS SHOWN ON THE DRAWINGS, UNLESS A MORE WORKABLE PLAN IS AGREED TO BY THE ENGINEER PRIOR TO OR DURING THE PROSECUTION OF THE WORK.
 - B. WORK ON OR NEAR THE TRANSFER STATION FLOOR AND THE ACCESS DOORS TO THE FLOOR WILL BE MINIMIZED DURING OPERATING HOURS OF THE TRANSFER STATION. CONTRACTOR WILL BE ALLOWED ACCESS 24 HOURS PER DAY. WORK RELATED TO THE TRANSFER STATION FLOOR AND THE MANEUVERING AREA SHOULD BE CONDUCTED FROM CLOSE OF TRANSFER STATION ON SATURDAY TO TRANSFER STATION OPENING THE FOLLOWING MONDAY MORNING.
- 1.2 CONSTRUCTION TRAFFIC CONTROL DEVICES
 - A. DESCRIPTION – THE WORK COVERED BY THIS SECTION CONSISTS OF FURNISHING, ERECTING, MAINTAINING, RELOCATING, AND REMOVING TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS, MUTCD, NCDOT, OR AS DIRECTED BY THE ENGINEER. THE MUTCD REFERRED TO IN THIS PROVISION SHALL BE THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, AS PREPARED BY THE NATIONAL ADVISORY COMMITTEE ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING ALL STANDARD DOCUMENTS REFERRED TO IN THE SECOND PARAGRAPH OF SECTION 1A-7 OF THE MUTCD. THE CURRENT EDITION SHALL BE THE EDITION CURRENT ON THE DATE OF ADVERTISEMENT FOR THE PROJECT. ALL TRAFFIC CONTROL DEVICES FURNISHED BY THE CONTRACTOR SHALL REMAIN THE PROPERTY OF THE CONTRACTOR, UNLESS OTHERWISE REQUIRED BY THE CONTRACT. TRAFFIC CONTROL DEVICES SHALL INCLUDE, BUT NOT BE LIMITED TO SIGNS, NON-METALLIC DRUMS, BARRICADES, CONES, DELINEATORS, TEMPORARY GUARDRAIL, TEMPORARY PAVEMENT MARKING, RAISED REFLECTIVE PAVEMENT MARKERS, FLAGGERS AND PILOT VEHICLES, AS REQUIRED.
 - B. MATERIALS-GENERAL – UNLESS OTHERWISE REQUIRED, MATERIALS USED IN THE FABRICATION AND INSTALLATION OF CONSTRUCTION TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH THE APPLICABLE PROVISION OF THE MUTCD. WHEN TRAFFIC CONTROL DEVICES ARE NO LONGER REQUIRED FOR TRAFFIC HANDLING IN THE INITIAL PHASE OF CONSTRUCTION REQUIRING THEIR USE, THEY MAY BE REUSED AT VARIOUS LOCATIONS THROUGHOUT THE PROJECT PROVIDED THE DEVICE IS NOT DEFACED, IS STRUCTURALLY SOUND, CLEAN, AND OTHERWISE CONFORMS TO THE ABOVE REQUIREMENTS.
 - C. MATERIALS-TRANSFER STATION FLOOR – DEVICES USED ON THE TRANSFER STATION FLOOR AND AT THE ACCESS DOORS TO THE FLOOR MUST PROVIDE PROTECTION AGAINST FLYING DEBRIS FROM THE WHEELED MACHINES OPERATING ON THE FLOOR.

DIVISION 2 – SITE PREPARATION

- 2.1 GENERAL
 - A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SITE PREPARATION NECESSARY FOR THE WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN. THIS INCLUDES, BUT IS NOT LIMITED TO THE PROPER REMOVAL AND STORAGE OF TOPSOIL, THE PROPER REMOVAL AND DISPOSAL OF ALL SPOIL AND REFUSE MATERIALS, AND THE REMOVAL AND REINSTALLATION OF ANY ITEMS SUCH AS CULVERTS, STORM DRAINS, PAVED DITCHES, SIGNS, PAVEMENTS, WALKS, FENCES, MAILBOXES, ETC. AS MAY BE NECESSARY FOR CARRYING OUT THE WORK.
 - B. WHERE REMOVAL OF EXISTING STRUCTURES (SUCH AS DRIVEWAY CULVERTS, STORM DRAINS, ETC. AND/OR UTILITIES) IS REQUIRED IN ORDER TO CARRY OUT THE WORK, THE CONTRACTOR SHALL BE RESPONSIBLE FOR RE-INSTALLING THESE ITEMS TO THEIR ORIGINAL CONDITION AND FUNCTIONAL CAPACITY.
 - C. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS TO PREVENT ANY SEDIMENT FROM ENTERING ANY STORM DRAINS (CURB INLET FILTER BOX), DITCHES, STREAMS, OR BODIES OF WATER DOWNSTREAM OF ANY AREA DISTURBED BY CONSTRUCTION. EXCAVATED MATERIALS SHALL BE PLACED UPSTREAM OF ANY TRENCH OR OTHER EXCAVATION TO PREVENT SEDIMENTATION OF OFFSITE AREAS. IN AREAS WHERE A NATURAL BUFFER AREA EXISTS BETWEEN THE WORK AREA AND THE CLOSEST STREAM OR WATER COURSE, THIS AREA SHALL NOT BE DISTURBED.
 - D. AT THE COMPLETION OF THE WORK AT THIS SITE EACH DAY, ALL DEBRIS AND EXCESS CONSTRUCTION MATERIALS SHALL BE REMOVED BY THE CONTRACTOR, AND THE SITE SHALL BE LEFT CLEAN AND PRESENTABLE.
 - E. SPECIAL SITE CONDITIONS – THE CONTRACTOR SHALL NOT DISTURB ANY AREAS OUTSIDE THE CONSTRUCTION LIMITS DESIGNATED ON THE DRAWINGS. THE SITE SHALL BE RESTORED TO THE EXISTING GRADE AFTER CONSTRUCTION AND SHALL BE RETURNED TO ITS NATURAL STATE WITHIN 21 DAYS AFTER WORK IS COMPLETED.
- 2.2 CLEARING AND PAVEMENT REMOVAL
 - A. THE CONTRACTOR SHALL CLEAR ANY AREAS AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CLEARING THAT IS REQUIRED OUTSIDE THE PROPOSED AREAS, AND SHALL OBTAIN THE ENGINEER'S APPROVAL OF THE PROPOSED LIMITS OF THE AREAS TO BE CLEARED PRIOR TO STARTING ANY WORK.
 - B. CLEARING SHALL CONSIST OF CUTTING, REMOVAL, AND SATISFACTORY DISPOSAL OF ALL TREES, FALLEN TIMBER, BRUSH, RUBBISH, SANITARY LANDFILL MATERIAL, FENCING, AND OTHER PERISHABLE AND OBJECTIONABLE MATERIAL WITHIN THE DESIGNATED AREAS.
 - C. TOPSOIL SHALL BE STRIPPED FROM THE WORK AREA AND KEPT IN PILES UNTIL NEEDED FOR FINAL GRADING.
 - D. PAVEMENT REMOVAL SHALL CONSIST OF THE REMOVAL AND PROPER DISPOSAL OF ALL ASPHALT OR CONCRETE, ETC., ROAD SURFACES, DRIVEWAYS OR SIDEWALKS AS MAY BE NECESSARY FOR CARRYING OUT THE WORK.
- 2.3 DISPOSAL OF CLEARED MATERIAL
 - A. DISPOSAL OF TREES, STUMPS, ROOTS, BUSHES, REFUSE, EXCESS SOIL, ASPHALTIC OR CONCRETE MATERIALS, AND ITEMS CONTAINING NON-HAZARDOUS MATERIAL MAY BE DISPOSED ON SITE WITH PRIOR APPROVAL BY ENGINEER. HAZARDOUS MATERIALS OR ANY UNSUITABLE MATERIALS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR. OFF-SITE DISPOSAL AREAS ARE SUBJECT TO APPROVAL BY THE ENGINEER.

- 2.4 EXCAVATION OF PIPE TRENCH

ALL EXCAVATION SHALL BE MADE IN SUCH A MANNER AND TO SUCH WIDTHS AS WILL PROVIDE AMPLE ROOM FOR PROPERLY INSTALLING AND INSPECTING THE PIPE AND PERMIT THROUGH COMPACTION OF BACKFILL AROUND THE PIPE AND STRUCTURES. THE MINIMUM TRENCH WIDTHS SHALL BE IN STRICT ACCORDANCE WITH THE "TRENCH WIDTH EXCAVATION LIMITS" AS SHOWN ON THE DRAWINGS. ALL EXCAVATION AND TRENCHING SHALL BE DONE IN STRICT ACCORDANCE WITH THESE SPECIFICATIONS AND ALL APPLICABLE PARTS OF THE OSHA REGULATIONS, 29CFR 1926.

2.5 BEDDING AND BACKFILL MATERIALS

- A. ALL STRUCTURES AND PIPES SHALL BE BACKFILLED WITH THE TYPE OF MATERIALS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN. WHERE NOT SHOWN ON THE DRAWINGS, THE MATERIAL SHALL BE SELECT BACKFILL.
- B. TYPICAL TRENCH CROSS-SECTIONS ARE SHOWN ON THE DRAWINGS.
- C. CRUSHED STONE BEDDING MATERIAL SHALL BE GRAVEL-SAND MIXTURE FREE FROM ORGANIC MATERIAL AND MEETING ALL THE REQUIREMENTS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION FOR NO. 57 STONE. WHEN TESTED ACCORDING TO ASTM D422, THE BEDDING MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION:

SIEVE	PERCENT PASSING (BY WEIGHT)
1"	100
¾"	90-100
¾"	20-56
NO. 4	0-10
NO. 8	0.5
NO. 200	0-0.6

- D. STONE BEDDING SHALL BE SPREAD IN LAYERS AND SHALL BE COMPACTED IN PLACE TO THE PROPER GRADE TO PROVIDE A SOLID BED FOR THE PIPE OR STRUCTURES FOR THE FULL WIDTH OF THE EXCAVATION.

- E. SELECT BACKFILL SHALL CONTAIN NO MAN MADE OR ORGANIC MATERIALS AND SHALL BE FREE OF ROCKS, CLODS, OR OTHER MATERIALS LARGER THAN 2 INCHES IN NOMINAL DIAMETER. MATERIALS FROM ON SITE EXCAVATIONS MAY BE USED FOR SELECT BACKFILL PROVIDED THEY MEET THE FOLLOWING SPECIFIED REQUIREMENTS.

1. SOILS FROM THE EXCAVATIONS CAPABLE OF BEING COMPACTED TO THE SPECIFIED DENSITIES, WITH THE EXCEPTIONS OF TOPSOIL AND ORGANIC MATERIAL, MEETING THE REQUIREMENTS STIPULATED IN DIVISION 2.6, PARAGRAPH B BELOW, MAY BE USED IN SPECIFIED LOCATIONS AS SELECT FILL FOR BACKFILLING. MATERIALS SHALL BE COMPACTED AT A MOISTURE CONTENT SATISFACTORY TO THE ENGINEER, WHICH SHALL BE APPROXIMATELY THAT REQUIRED TO PRODUCE THE MAXIMUM DENSITY EXCEPT THAT THE MOISTURE CONTENT SHALL NOT BE MORE THAN 3% ABOVE OR BELOW THE OPTIMUM MOISTURE CONTENT FOR THE PARTICULAR MATERIAL TESTED AS DETERMINED BY ASTM D 696. THE CONTRACTOR SHALL DRY OR ADD MOISTURE TO THE MATERIAL WHEN REQUIRED TO PROVIDE A UNIFORMLY COMPACTED AND STABLE BACKFILL. WHEN AIR DRYING OF EXCAVATED MATERIAL IS NECESSARY, THE CONTRACTOR MAY SPREAD, DISC, WINDROW, ETC. WHERE EXCAVATED MATERIAL DOES NOT MEET THE REQUIREMENTS SPECIFIED HEREIN FOR SELECT BACKFILL, THE CONTRACTOR SHALL FURNISH OFF-SITE BORROW MATERIAL MEETING THE SPECIFIED REQUIREMENTS FOR SELECT FILL. BACKFILL MATERIAL BORROWED OFF-SITE SHALL BE OF A NATURE MEETING THE REQUIREMENTS STIPULATED HEREIN.

- F. THE MATERIALS SHALL NOT BE EXPANSIVE, NOR HAVE HIGH ORGANIC CONTENT AND SHALL MEET THE FOLLOWING REQUIREMENTS:

1. MAXIMUM LIQUID LIMIT SHALL NOT EXCEED 50 AS DETERMINED BY ASTM D4318.
2. MAXIMUM PLASTICITY INDEX SHALL NOT EXCEED 25 AS DETERMINED BY ASTM D4318.
- G. IF SUFFICIENT ON-SITE SELECT BACKFILL MATERIAL IS NOT AVAILABLE, THE CONTRACTOR SHALL SECURE ACCEPTABLE MATERIALS FROM AN OFF-SITE BORROW AREA AT NO ADDITIONAL COST TO THE OWNER. OFF-SITE BORROW AREAS SHALL BE APPROVED BY THE ENGINEER BEFORE ANY MATERIAL IS TRANSPORTED TO THE WORK AREA.
- H. BACKFILL SHALL BE FREE OF ALL ORGANIC MATERIALS AND SHALL NOT CONTAIN ANY ROCKS LARGER THAN 4-INCHES IN DIAMETER. MATERIALS FROM ON-SITE EXCAVATIONS MAY BE USED FOR BACKFILL PROVIDED THEY MEET THE SPECIFIED REQUIREMENTS INDICATED FOR SELECT BACKFILL INDICATED ABOVE. IF SUFFICIENT ON-SITE BACKFILL MATERIAL IS NOT AVAILABLE, THE CONTRACTOR SHALL SECURE ACCEPTABLE MATERIALS FROM AN OFF-SITE BORROW AREA AT NO ADDITIONAL COST TO THE OWNER. OFF-SITE BORROW AREAS SHALL BE APPROVED BY THE ENGINEER BEFORE ANY MATERIAL IS TRANSPORTED TO THE WORK AREA.

2.6 BEDDING & BACKFILL INSTALLATION

- A. ALL STRUCTURES AND PIPE TRENCHES SHALL BE BACKFILLED AS SOON AS PRACTICAL AFTER INSTALLATION. BACKFILL MATERIALS SHALL BE AS PREVIOUSLY DESCRIBED IN PARAGRAPH 2.5 AND AS SHOWN ON THE DRAWINGS.
- B. BACKFILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH LIFTS AND THOROUGHLY COMPACTED WITH MECHANICAL TAMPS OR BY HAND TAMPING AS REQUIRED TO ACHIEVE THE SPECIFIED COMPACTION DENSITIES. COMPACTION DENSITIES SHALL BE AS FOLLOWS:

MATERIAL CLASSIFICATIONS	AASHTO-T99 DENSITY
CRUSHED STONE BEDDING	95% STANDARD PROCTOR
SELECT BACKFILL	96% STANDARD PROCTOR
BACKFILL	98% STANDARD PROCTOR
AGGREGATE BASE COURSE (ABC)	100% STANDARD PROCTOR
BACKFILL AROUND STRUCTURES	96% STANDARD PROCTOR

THE CONTRACTOR SHALL FURNISH FOR APPROVAL STANDARD SAMPLES OF ONE CUBIC FOOT EACH OF EACH MATERIAL CLASSIFICATION USED. THE ENGINEER MAY REQUIRE COMPACTION TESTS BY AN APPROVED TESTING LAB IN ORDER TO VERIFY THAT THE REQUIRED COMPACTION DENSITIES ARE BEING ACHIEVED. SUCH TEST, WHERE REQUIRED BY THE ENGINEER, WILL BE PROVIDED BY THE OWNER AT HIS EXPENSE.

DENSITY TEST SHALL BE PERFORMED EVERY 100 FEET OF TRENCH LENGTH, EVERY 400 SQUARE FEET OF PAVEMENT, AND EVERY 24 INCHES OF FILL PLACED. DENSITY TESTS FOR AGGREGATE BASE COURSE MATERIAL (ABC) SHALL BE PERFORMED AT THE SAME INTERVAL. DENSITY TEST AT OTHER LOCATIONS SHALL BE AT THE DISCRETION OF THE ENGINEER. THE CONTRACTOR SHALL ALLOW ADEQUATE TIME FOR SUCH TESTS TO BE PERFORMED.

2.7 RESTORATION

- A. WHERE TRENCHES CROSS OR DISTURB PAVED STREETS, DRIVEWAYS, PARKING AREAS, SIDEWALKS AND CURBS, THE CONTRACTOR SHALL REMOVE WHERE NECESSARY AND SHALL REPLACE ALL PORTIONS OF PAVEMENTS, CURBS, SIDEWALKS, AND DRIVEWAYS DESTROYED OR DAMAGED BY HIS OPERATION. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO PROTECT THE EXISTING PAVEMENT FROM DAMAGE BY HIS EQUIPMENT DURING CONSTRUCTION. IT IS THE INTENT OF THESE SPECIFICATIONS THAT THE CONTRACTOR LEAVE ALL PAVED SURFACES AFFECTED BY THE CONSTRUCTION WORK EQUAL TO OR BETTER THAN THE ORIGINAL CONDITION AND THAT ALL WORK BE DONE IN CONFORMANCE WITH APPROVED PRACTICE.
- B. THE CONTRACTOR SHALL NOT BEGIN FINAL RESTORATION WORK UNTIL THE SUBGRADE HAS BEEN INSPECTED AND APPROVED BY CITY OF DURHAM AND OR THE ENGINEER. ALL TEMPORARY AND PERMANENT SEEDING SHALL BE IN ACCORDANCE WITH CITY OF DURHAM STANDARDS.

C. CURBS

1. CURBS SHALL BE REBUILT TO ORIGINAL LINES, GRADE, CROSS-SECTION AND FINISH. ANY CURBING THAT HAS SETTLED OR SHIFTED SHALL BE RE-LAID. CONCRETE FOR CURBS SHALL BE CLASS A AND SHALL HAVE BITUMINOUS EXPANSION JOINT MATERIAL MATCHING THE CROSS SECTION AT ENDS OF REPLACEMENT SECTIONS. REINFORCEMENT SHALL BE REQUIRED FOR ALL CURBS EVEN WHEN THE ORIGINAL HAD NONE.

2.8 EROSION AND SEDIMENTATION CONTROLS

- A. IT IS THE INTENT OF THE SPECIFICATION THAT THE CONTRACTOR CONDUCT THE CONSTRUCTION ACTIVITIES IN SUCH A MANNER THAT EROSION OF DISTURBED AREAS AND OFF SITE SEDIMENTATION BE ABSOLUTELY MINIMIZED.

1. ALL WORK UNDER THIS CONTRACT SHALL BE DONE IN CONFORMANCE WITH AND SUBJECT TO THE LIMITATIONS OF THE NORTH CAROLINA RULES AND REGULATIONS FOR EROSION AND SEDIMENTATION CONTROL AS ADOPTED BY THE NORTH CAROLINA SEDIMENTATION CONTROL COMMISSION (15 NCAC, CHAPTER 4) AND THE CITY OF DURHAM STORMWATER STANDARDS FOR THE SITE

B. STONE CHECK DAMS:

1. STONE CHECK DAMS SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN. THE STONE CHECK DAMS SHALL BE CONSTRUCTED AND MAINTAINED TO THE SATISFACTION OF THE ENGINEER UNTIL A VEGETATIVE GROUND COVER HAS BEEN ESTABLISHED. PROPER MAINTENANCE WILL INCLUDE, BUT NOT BE LIMITED TO, THE PERIODIC REMOVAL OF TRAPPED SEDIMENTS.
2. THE ENGINEER MAY DIRECT THE CONTRACTOR TO ERECT AND MAINTAIN STONE CHECK DAMS AT OTHER LOCATIONS NOT SHOWN ON THE DRAWINGS.

C. STONE FILTER INLET PROTECTION

1. STONE FILTER INLET PROTECTION SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN. THE STONE FILTER INLET PROTECTION SHALL BE CONSTRUCTED AND MAINTAINED TO THE SATISFACTION OF THE ENGINEER UNTIL A VEGETATIVE GROUND COVER HAS BEEN ESTABLISHED. PROPER MAINTENANCE WILL INCLUDE, BUT NOT BE LIMITED TO, THE PERIODIC REMOVAL OF TRAPPED SEDIMENTS. THE COST OF THE STONE FILTER INLET PROTECTION SHALL INCLUDE THE EXCAVATION, GRADING, WASHED STONE, MESH HARDWARE CLOTH, STEEL POST, ETC., AND ALL MAINTENANCE ACTIVITIES REQUIRED.

- D. THE ENGINEER MAY DIRECT THE CONTRACTORS TO ERECT AND MAINTAIN STONE FILTER INLET PROTECTION AT OTHER LOCATIONS NOT SHOWN ON THE DRAWINGS AT THE COST OF THE CONTRACTOR.

DIVISION 3 – CONCRETE

3.1 GENERAL

- A. CONCRETE FOR USE AT THE TRANSFER STATION ENTRANCE SLAB SHALL BE HIGH-EARLY STRENGTH CONCRETE UTILIZING TYPE III CEMENT. ALL OTHER CONCRETE MAY BE NORMAL SETTING USING TYPE I OR I/II CEMENT.
- B. A LIGHT BROOM SURFACE CONCRETE FINISH SHALL BE USED FOR EXTERIOR CONCRETE SLAB-ON-GRADE WORK. A HARD-TROWEL SURFACE CONCRETE FINISH SHALL BE USED FOR INTERIOR CONCRETE SLAB-ON-GRADE WORK.
- C. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
- D. JOINT DOWEL BARS USED FOR SLAB-ON-GRADE SHALL CONFORM TO ASTM A615, GRADE 60, PLAIN-STEEL BARS, CUT BARS TRUE TO LENGTH WITH ENDS SQUARE AND FREE OF BURRS.
- E. BAR SUPPORTS CONSISTING OF BOLSTERS, CHAIRS, AND SPACERS SHALL BE MANUFACTURED ACCORDING TO CRSI'S "MANUAL OF STANDARD PRACTICES".

3.2 CONCRETE MATERIALS

- A. CEMENT SHALL CONFORM TO STANDARD SPECIFICATIONS OF ASTM C150 FOR TYPE I, I/II OR III PORTLAND CEMENT. CEMENT CAN BE SUPPLEMENTED WITH FLY ASH (ASTM C618, CLASS F) UP TO 15% BY WEIGHT. FINE AGGREGATE SHALL BE WELL GRADED NATURAL SAND AND COARSE AGGREGATE SHALL BE CRUSHED STONE OR GRAVEL AND FREE OF MATERIALS WITH DELETERIOUS REACTIVITY TO ALKALI IN CEMENT. THEY SHALL CONFORM TO STANDARD SPECIFICATIONS OF ASTM C33 FOR CONCRETE AGGREGATES. COARSE AGGREGATE SHALL BE UNIFORMLY GRADED WITH A MAXIMUM COARSE-AGGREGATE SIZE OF 3/4-INCH. THE CONTRACTOR SHALL FURNISH FOR APPROVAL STANDARD MIX DESIGNS IN ACCORDANCE WITH ACI 318. FOR THE PURPOSE OF THIS WORK, ONLY WATER FROM A POTABLE WATER SYSTEM CONFORMING TO ASTM C94 MAY BE USED.

3.3 READY-MIXED CONCRETE

- B. READY-MIXED CONCRETE MAY BE USED IN LIEU OF JOB MIXED CONCRETE IF THE FACILITIES COMPLY WITH STANDARD SPECIFICATIONS FOR READY-MIXED CONCRETE, ASTM C94. THE PLANT SHALL CERTIFY THAT MATERIALS AND STRENGTHS MEET THE REQUIREMENTS STATED HEREIN AND SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER. BATCH DELIVERIES SHALL NOT EXCEED THE RATED CAPACITY SPECIFIED FOR THE MIXER BY THE EQUIPMENT MANUFACTURER.

3.4 PROPORTIONING

- A. THE FOLLOWING SPECIFICATION SHALL APPLY: (CAST IN PLACE CONCRETE ONLY)

CONCRETE COMPONENT/PROPERTY	VALUE
MINIMUM CEMENT CONTENT POUNDS PER CU. YD.	665
MAXIMUM WATER-CEMENT RATIO	0.40
SLUMP RANGE (PRIOR TO WATER-REDUCING ADMIXTURES)	4", ±1"
TOTAL AIR CONTENT	5%, ±1%
MINIMUM STRENGTH – 28 DAYS (PSI)	
TRANSFER STATION ENTRY SLAB (BAYS 1, 2 & 3) & TRENCH DRAIN	6,000
ALL OTHER CONCRETE	4,000

3.5 JOINTS

A. CONSTRUCTION JOINTS:

1. INSTALL SO STRENGTH AND APPEARANCE OF CONCRETE ARE NOT IMPAIRED, AT LOCATIONS INDICATED OR AS APPROVED BY ENGINEER. CONTINUE REINFORCEMENT ACROSS CONSTRUCTION JOINTS, UNLESS OTHERWISE INDICATED.

B. CONTROL JOINTS:

1. FORM WEAKENED-PLANE CONTROL JOINTS, SECTIONING CONCRETE INTO AREAS AS INDICATED. CONSTRUCT CONTROL JOINTS FOR A DEPTH EQUAL TO AT LEAST ONE-FOURTH OF CONCRETE THICKNESS AS FOLLOWS:
2. FORM CONTROL JOINTS WITH POWER SAWS EQUIPPED WITH SHATTERPROOF ABRASIVE OR DIAMOND-RIMMED BLADES. CUT ¼ -INCH WIDE JOINTS INTO CONCRETE WHEN CUTTING ACTION WILL NOT TEAR, ABRAD, OR OTHERWISE DAMAGE SURFACE AND BEFORE CONCRETE DEVELOPS RANDOM CONTRACTION CRACKS. SAWCUTS MUST BE COMPLETED WITHIN 24 HOURS OF COMPLETION OF THE SLAB POUR, OR PRIOR TO ANY SHRINKAGE CRACKING IN THE SLAB.

C. DOWELED JOINTS:

1. INSTALL DOWEL BARS AND SUPPORT ASSEMBLIES AT JOINTS WHERE INDICATED. USE DOWEL SLEEVES OR LUBRICATE OR ASPHALT COAT ONE-HALF OF DOWEL LENGTH TO PREVENT CONCRETE BONDING TO ONE SIDE OF JOINT.

3.6 MIXING AND PLACING CONCRETE

- A. CONCRETE SHALL BE MIXED IN AN APPROVED ROTATING TYPE MIXER FOR AT LEAST 1-1/2 MINUTES AFTER ALL INGREDIENTS ARE ASSEMBLED. IT SHALL BE DEPOSITED IMMEDIATELY AFTER MIXING. COMPLY WITH ACI 302.1R RECOMMENDATIONS FOR SCREEDING, RE-STRAIGHTENING, AND FINISHING OPERATIONS FOR CONCRETE SURFACES. ALL EXPOSED FINISHED SURFACES SHALL BE KEPT MOIST AND COVERED FOR A PERIOD OF AT LEAST 7 DAYS.

DIVISION 15 – PIPE MATERIALS AND APPURTENANCES

15.1 GENERAL

- A. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, TOOLS AND SERVICES REQUIRED FOR THE FURNISHING AND INSTALLATION OF ALL PIPING APPURTENANCES AS SHOWN ON THE DRAWINGS AND SPECIFIED IN THIS SECTION. PIPING SHALL INCLUDE ALL FITTINGS, ADAPTER PIECES, COUPLINGS, BOLTS, GASKETS, SUPPORTS AND OTHER ASSOCIATED APPURTENANCES FOR REQUIRED CONNECTIONS TO EXISTING VALVES, PIPING, STRUCTURES AND MANHOLES.

- B. PERFORMANCE AFFIDAVIT AND SHOP DRAWINGS: THE CONTRACTOR SHALL ADVISE THE ENGINEER IN WRITING OF THE PIPE MATERIAL, PIPE JOINTS, AND THE DETAILS OF FITTINGS. THE ENGINEER SHALL REVIEW THE SUBMITTAL AND APPROVE ITS CONFORMANCE WITH THE SPECIFICATIONS BEFORE THE PIPE MATERIAL IS ORDERED.

15.2 PIPE MATERIAL

- A. SPECIAL CARE IN HANDLING SHALL BE EXERCISED DURING DELIVERY, DISTRIBUTION, AND STORAGE OF PIPE TO AVOID DAMAGE AND UNNECESSARY STRESSES. DAMAGED PIPE WILL BE REJECTED AND SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. PIPE AND SPECIALS STORED PRIOR TO USE SHALL BE STORED IN SUCH A MANNER AS TO KEEP THE INTERIOR FREE FROM DIRT AND FOREIGN MATTER.

- B. TESTING AFTER THE PIPE IS INSTALLED SHALL BE AS SPECIFIED IN PARAGRAPH 15.4

- C. POLYVINYL CHLORIDE PIPE – ALL SPECIAL AND EVERY LENGTH OF PIPE SHALL BE MARKED WITH THE MANUFACTURER'S NAME ON TRADEMARK, SIZE, THICKNESS CLASS AND THE WORD "PVC".

1. PUSH-ON JOINT – PUSH-ON JOINT INCLUDES A SINGLE RUBBER GASKET WHICH FITS INTO THE BELT END OF THE PIPE. THE GASKET SHALL BE WIPED CLEAN, FLEXED AND THEN PLACED IN THE SOCKET. ANY BULGES IN THE GASKET WHICH MIGHT INTERFERE WITH THE ENTRY OF THE PLAIN END OF THE PIPE SHALL BE REMOVED. A THIN FILM OF LUBRICANT SHALL BE APPLIED TO THE GASKET SURFACE WHICH WILL COME INTO CONTACT WITH THE SPIGOT END OF THE PIPE. THE LUBRICANT SHALL BE FURNISHED BY THE PIPE MANUFACTURER.

2. THE PLAIN END OF THE PIPE, WHICH IS TAPERED FOR EASE OF ASSEMBLY, SHALL BE WIPED CLEAN AND A THICK FILM OF LUBRICANT APPLIED TO THE OUTSIDE. THE PIPE SHALL BE ALIGNED AND CAREFULLY ENTERED INTO THE SOCKET UNTIL IT JUST MAKES CONTACT WITH THE GASKET. THE JOINT ASSEMBLY SHALL BE COMPLETED BY ENTERING THE PIPE PAST THE GASKET UNTIL IT MAKES CONTACT WITH THE BOTTOM OF THE SOCKET. THE PIPE SHALL BE PULLED "HOME" WITH AN APPROVED JACK ASSEMBLY AS RECOMMENDED BY THE PIPE MANUFACTURER. IF ASSEMBLY IS NOT ACCOMPLISHED BY REASONABLE FORCE, THE PLAIN END SHALL BE REMOVED AND THE CONDITION CORRECTED.

3. PLASTIC PIPE IN SIZES BETWEEN 4 INCHES AND 12 INCHES SHALL MEET THE REQUIREMENTS OF ASTM D1785 OR D3034 DEPENDING ON TYPE SHOWN ON THE DRAWINGS AND SHALL CONFORM TO ALL THE REQUIREMENTS OF ASTM D1784 AND ASTM D2241. BURIED PIPE SHALL BE A MINIMUM OF DR 35 AND SHALL BE CAPABLE OF WITHSTANDING THE OVERBURDEN PRESSURES DETERMINED BY THE DEPTH OF BURIAL IN THE FIELD.

4. PIPE MATERIAL SHALL BE MADE FROM CLEAN, VIRGIN, NSF APPROVED CLASS 12454-A PVC COMPOUND CONFORMING TO RESIN SPECIFICATION ASTM D1784. STANDARD LAYING LENGTHS SHALL BE 20-FEET (±1 INCH). RANDOM LENGTHS OF NOT MORE THAN 15% OF THE TOTAL FOOTAGE OF EACH SIZE MAY BE SHIPPED IN LIEU OF THE STANDARD LENGTHS. RETURNS OF RECLAIMED MATERIAL SHALL NOT BE ACCEPTED.

5. THE PIPE SHALL HAVE BELL AND SPIGOT ENDS WITH PUSH-ON, O-RING RUBBER GASKET, COMPRESSION TYPE JOINTS CONFORMING TO THE REQUIREMENTS OF ASTM2677.

6. MINIMUM PIPE STIFFNESS (F/DY) AT 5% DEFLECTION SHALL BE 435 PSI FOR ALL SIZES WHEN TESTED IN ACCORDANCE WITH D2241.

- D. DUCTILE IRON PIPE – ALL DUCTILE IRON PIPE SHALL BE IN ACCORDANCE WITH ANSI/AWWA C151/A21.51. JOINTS SHALL BE PUSH ON WITH MECHANICAL JOINTS AT ALL FITTINGS. FITTINGS SHALL BE IN ACCORDANCE WITH ANSI/AWWA C153/A21.53.

15.3 INSTALLATION OF PIPE

- A. ALL PIPING SHALL BE INSTALLED TO THE CORRECT LINE AND GRADE, WITH NO ABRUPT CHANGES IN LINE OR GRADE AND AS SHOWN ON THE DRAWINGS. JOINT DEFLECTION SHALL NOT EXCEED 75 PERCENT OF THE MANUFACTURER'S RECOMMENDED DEFLECTION. ALL GRAVITY SEWER PIPE SHALL BE RUN IN STRAIGHT LINES AND A UNIFORM SLOPE BETWEEN ELEVATIONS SHOWN. ALL GRAVITY SEWER PIPE SHALL BE LAID UPGRADE BEGINNING AT THE LOWER END OF THE PIPE, WITH THE BALL END OF EACH JOINT UPGRADE. CHANGES IN PIPE MATERIAL SHALL ONLY BE MADE AT MANHOLES. EXCAVATION AND BACKFILLING SHALL CONFORM TO THE REQUIREMENTS OF THIS SECTION. MAXIMUM TRENCH WIDTHS SHALL CONFORM TO THE TRENCH WIDTH EXCAVATION LIMITS SHOWN ON THE DRAWINGS.

- B. ORDINARILY ONLY FULL LENGTHS OF PIPE AS FURNISHED BY THE PIPE MANUFACTURER SHALL BE USED. EXCEPTIONS: (CLOSURE PIECES AT MANHOLES AND AREAS WHERE JOINT DEFLECTION IS REQUIRED).

- C. FOR GRAVITY SEWER INSTALLATIONS, THE CONTRACTOR SHALL USE A LASER DEVICE TO MAINTAIN THE TRENCH AND PIPE ALIGNMENT. THE LASER DEVICE SHALL BE RE-CHECKED FOR CORRECT ELEVATION AND PIPE ALIGNMENT PRIOR TO PIPE INSTALLATION IF THE DEVICE IS LEFT IN THE PIPE OVERNIGHT.

- D. PLASTIC PIPE – POLYVINYL CHLORIDE (PVC) PIPE SHALL BE LAID AND JOINTS ASSEMBLED ACCORDING TO THE RESPECTIVE MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE SECTIONS OF THE UNI-BELL PVC PIPE ASSOCIATION RECOMMENDED STANDARD SPECIFICATIONS.

- E. ALL SANITARY SEWERS SHALL BE INSTALLED WITHIN 0.10% OF THE DESIGN SLOPE.

15.4 FLUSHING AND TESTING

- A. THE OWNER SHALL PROVIDE REASONABLE QUANTITIES OF WATER FOR ALL FLUSHING AND TESTING. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MEANS AND APPARATUS NECESSARY FOR GETTING THE WATER INTO THE PIPE AND FLUSHING AND TESTING; INCLUDING PUMPS, GAUGES, AND METERS, ANY NECESSARY PLUGS AND CAPS, AND ANY TEMPORARY BLOW OFF PIPING REQUIRED TO DISCHARGE WATER, ETC. COMPLETE WITH ANY NECESSARY REACTION BLOCKING TO PREVENT PIPE MOVEMENT DURING THE FLUSHING AND TESTING.

- B. ALL PIPE SHALL BE FLUSHED AND TESTED IN SUCH LENGTHS SECTIONS AS AGREED UPON AMONG THE OWNER, ENGINEER, AND CONTRACTOR. THE CONTRACTOR SHALL GIVE THE OWNER AND ENGINEER REASONABLE NOTICE OF THE TIME WHEN HE INTENDS TO TEST PORTIONS OF THE PIPE. THE ENGINEER RESERVES THE RIGHT, WITHIN REASON, TO REQUEST FLUSHING AND TESTING OF ANY SECTION OR PORTION OF THE PIPE. RAW WATER OR NON-POTABLE WATER MAY BE USED FOR FLUSHING AND TESTING PIPE FOR FLUSHING AND TESTING THE POTABLE WATER SYSTEMS. THE CONTRACTOR SHALL PROVIDE A MEANS OF PREVENTING ANY SILT OR SAND FROM BEING INTRODUCED INTO THE PIPE DURING FLUSHING AND TESTING IF STREAM WATER (RAW WATER) IS TO BE USED, AND THE METHOD MUST BE APPROVED BY THE ENGINEER PRIOR TO USE.

- C. LOW PRESSURE COMPRESSED AIR TEST – ALL GRAVITY SEWER PIPE LESS THAN 30-INCHES SHALL BE CONSIDERED ACCEPTABLE, WHEN TESTED AND ACCEPTED IN ACCORDANCE WITH THE AIR TEST TABLE SHOWN BELOW AND THE AIR TEST FORM THAT WILL BE PROVIDED BY THE ENGINEER DURING CONSTRUCTION AS REQUESTED BY THE CONTRACTOR. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF ANY TESTING AND SHALL BE PRESENT FOR ALL TESTING.

1. WHERE THE ACTUAL LEAKAGE EXCEEDS THE ALLOWABLE, THE CONTRACTOR SHALL DISCOVER THE CAUSE AND CORRECT IT BEFORE THE SEWER WILL BE ACCEPTED. FOR THE PURPOSE OF THIS SUBSECTION, A SECTION OF SEWER IS DEFINED AS THAT LENGTH OF SEWER BETWEEN SUCCESSIVE MANHOLES OR SPECIAL STRUCTURES OR STUB-OUTS FOR FUTURE CONNECTIONS.

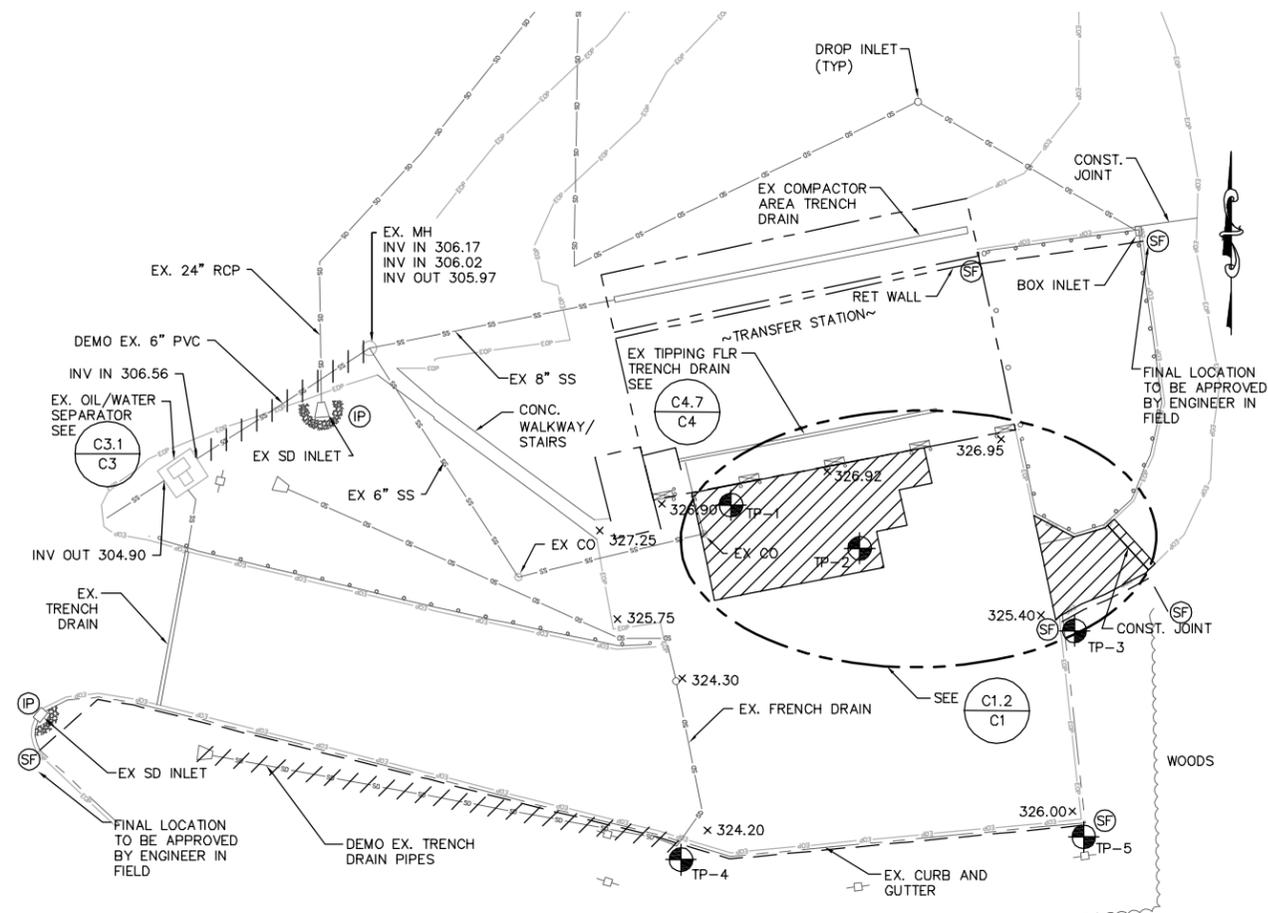
2. LOW PRESSURE CAT LEAKAGE TEST PROCEDURE – THE LOW PRESSURE AIR TEST SHALL BE PERFORMED BEFORE ALL LATERALS OR STUBS ARE INSTALLED ON THE LINE AND AFTER THE MAIN HAS BEEN BACKFILLED TO FINISHED GRADE. PLUGS SHALL BE INSTALLED AT EACH MANHOLE TO SEAL OFF THE TEST SECTION. THE LINE SHALL BE PRESSURIZED WITH A SINGLE HOSE AND MONITORED BY A SEPARATE HOSE CONNECTION FROM THE PLUG. AIR SHALL THEN BE SLOWLY INTRODUCED INTO THE SEALED LINE UNTIL INTERNAL AIR PRESSURE REACHES 4.0 PSIG. THE PRESSURE SHALL THEN BE ALLOWED TO STABILIZE FOR 2 MINUTES AT NO LESS THAN 3.5 PSIG (PLUS GROUNDWATER PRESSURE, IF ANY). WHEN THE PRESSURE REACHES 3.5 PSIG, THE TIME REQUIRED FOR THE PRESSURE TO DROP 1.0 PSI WILL BE OBSERVED AND RECORDED. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF ANY TESTING AND SHALL BE PRESENT FOR ALL TESTING.

3. WHERE THE ACTUAL LEAKAGE EXCEEDS THE ALLOWABLE, THE CONTRACTOR SHALL DISCOVER THE CAUSE AND CORRECT IT BEFORE THE SEWER WILL BE ACCEPTED. FOR THE PURPOSE OF THIS SUBSECTION, A SECTION OF SEWER IS DEFINED AS THAT LENGTH OF SEWER BETWEEN SUCCESSIVE MANHOLES OR SPECIAL STRUCTURES OR STUB-OUTS FOR FUTURE CONNECTIONS.

ALLOWABLE PIPE LEAKAGE RATES LOW PRESSURE AIR TESTS		
PIPE DIA. IN	TIME, MINUTES/100 LF	
4	3: 46	
6	5: 40	
8	7: 34	

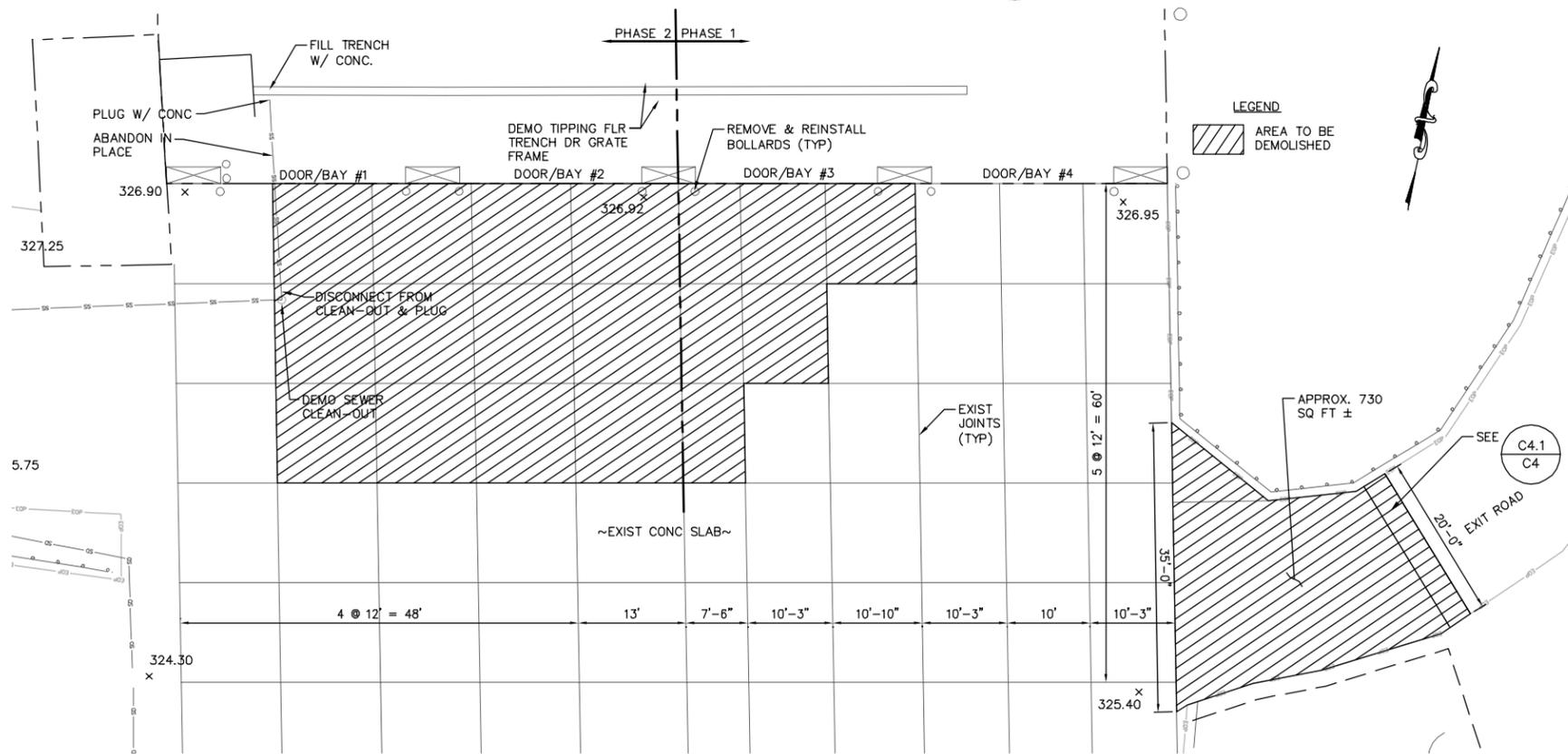
No.	Date	By	Apprd				
			RCS	GTS	5/12/11		
1	1	BID ISSUE	Submittal / Revision				
			RCS	GTS	6/8/11		
2	2	BID ISSUE REVISED					

File: V:\PROJECTS\CHNC\22714\CADD\ACAD\OIPRODUCTION\C1.DWG
 Saved: 6/14/2011 11:08:40 AM Plotted: 6/14/2011 11:12:28 AM User: Hodge, Chris LastSavedBy: 3771



SITE DEMOLITION PLAN

SCALE: 1"=30'



ENLARGED SITE DEMO PLAN

SCALE: 1"=10'

SEQUENCE OF DEMOLITION/CONSTRUCTION

1. DEMOLITION & CONSTRUCTION SHALL BE PHASED SUCH THAT THE WORK IN THE AREAS OF DOORS #3 & #4 IS COMPLETED AND WHILE DOORS #1 & #2 MUST REMAIN OPEN FOR OPERATION.
2. DEMOLITION & CONSTRUCTION OF THE EXIT ROAD SHALL BE COMPLETED AT THE SAME TIME AS THE AREAS OF DOORS #3 & #4 ARE COMPLETED.
3. DEMOLITION & CONSTRUCTION IN THE AREA OF DOORS #1 & #2 SHALL BE COMPLETED WHILE DOORS #3 & #4 MUST REMAIN OPEN FOR OPERATION.
4. DEMOLITION & CONSTRUCTION FOR EXISTING TRENCH DRAIN SHALL BE PHASED TO COINCIDE WITH WORK IN AREAS OF DOORS AS SHOWN IN C1.2.
5. DEMOLITION & CONSTRUCTION AT OR NEAR EXISTING MANHOLE SHALL NOT RESTRICT TRANSFER VEHICLE ACCESS TO LOADOUT AREA.

No.	Submittal / Revision	Appd.	By	Date
1	BID ISSUE	RCS	GTS	5/12/11
2	BID ISSUE REVISED	RCS	GTS	6/8/11

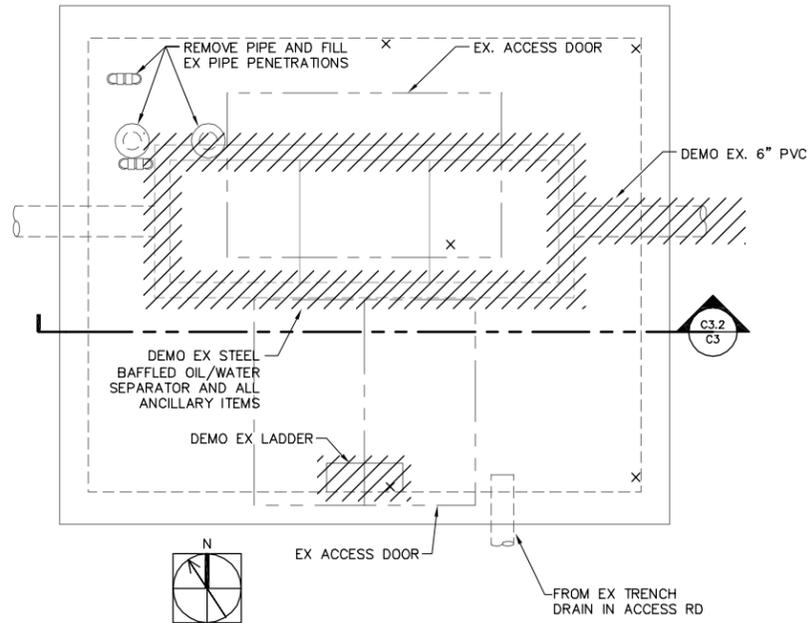
CITY OF DURHAM, NC



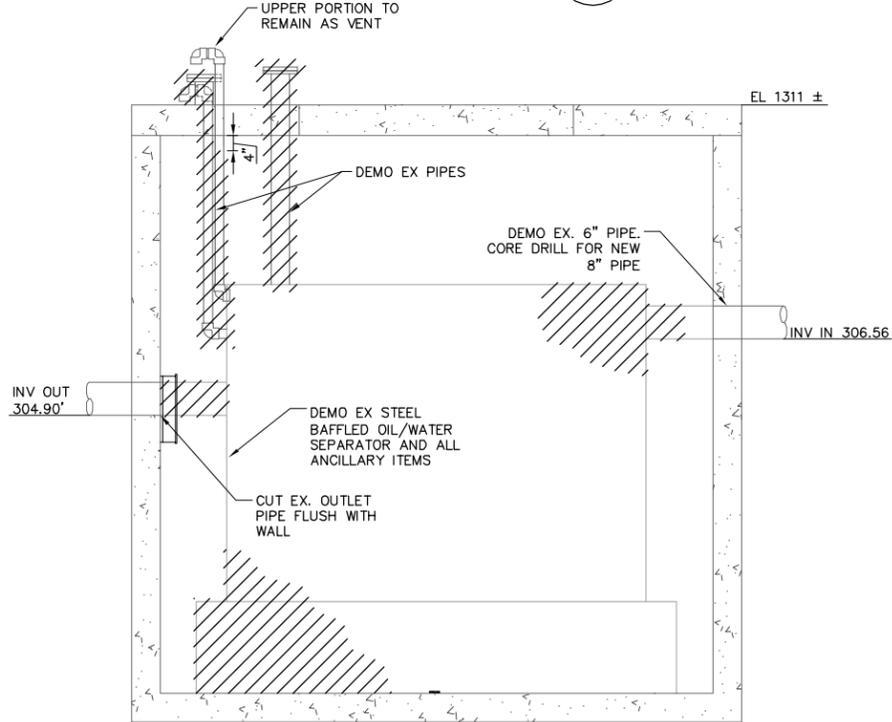

 Drawing Copyright © 2011
 1195 Kildare Farm Road, Suite 200 - Cary, NC 27511-4877
 Main: (919) 667-6222 · www.chicomp.com
 NC Engineering License F-1165
 Designated: GTS | Drawn: MUMCCH | Checked: JSR

TRANSFER STATION RENOVATION
 SITE DEMOLITION & EROSION CONTROL PLAN
 Issue Date: 5/6/11 | Project No.: 22714 | Scale: AS SHOWN

C1

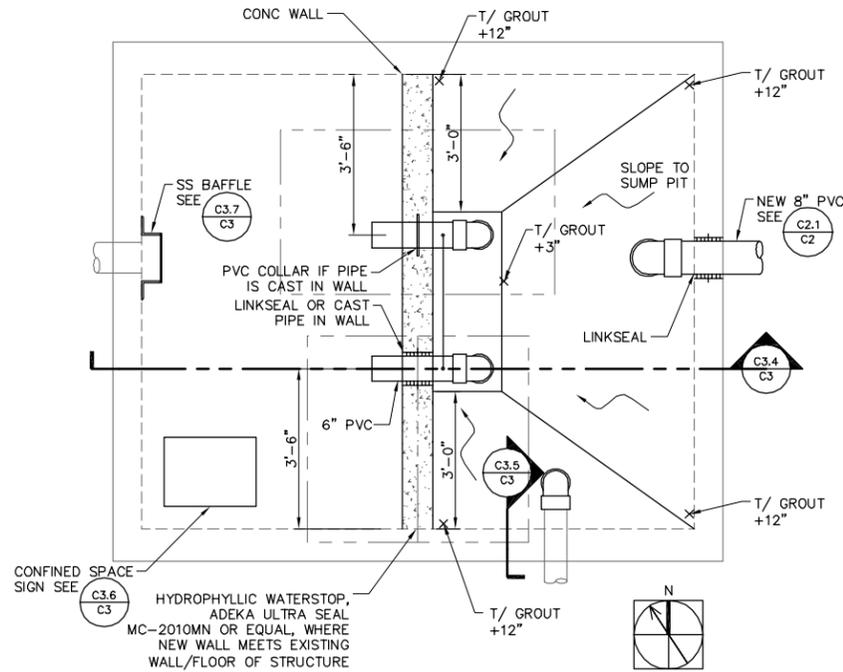


OIL/WATER SEPARATOR DEMO PLAN
SCALE: 1/2" = 1'-0"
C3.1
C3

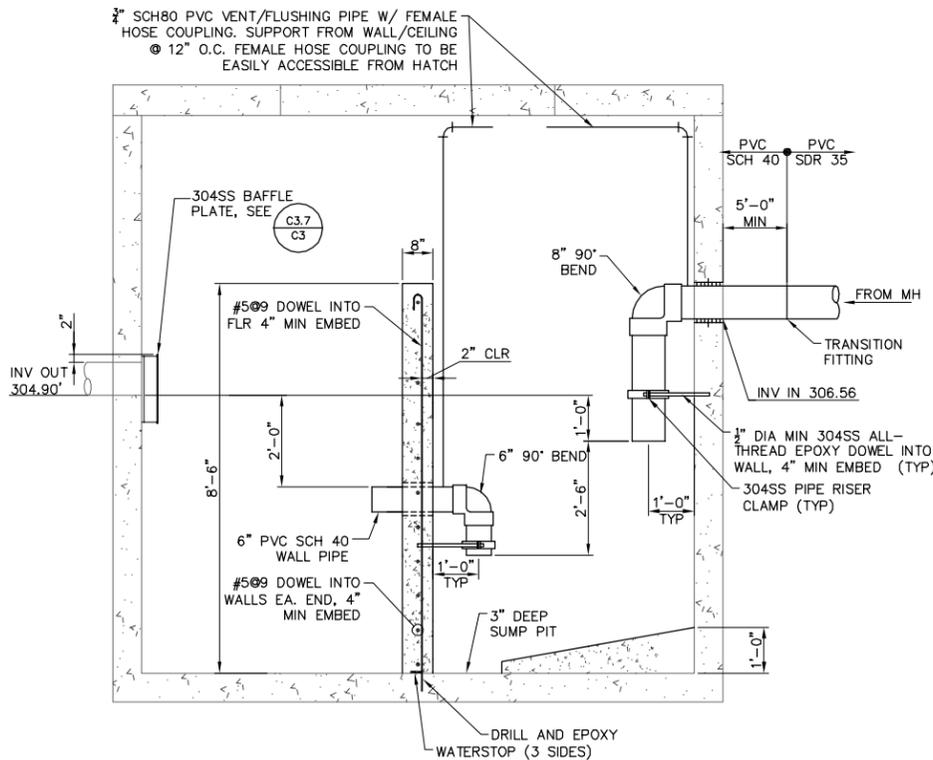


OIL/WATER SEPARATOR DEMO SECTION
SCALE: 1/2" = 1'-0"
C3.2
C3

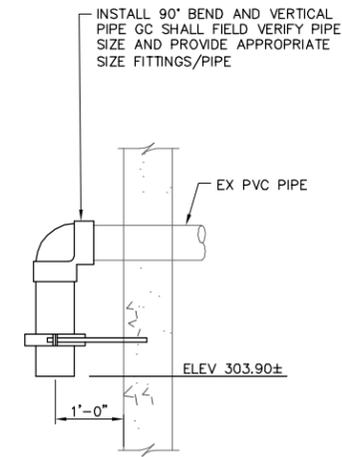
NOTE:
GC SHALL PRESSURE WASH INTERIOR OF O/W SEPARATOR AFTER DEMO AND BEFORE INSTALLATION OF NEW CONC WALL. GC SHALL UTILIZE PROPER SAFETY PROCEDURES AND PROTECTIVE EQUIPMENT AT ALL TIMES WHEN WORKING IN AND AROUND O/W SEPARATOR CONTAINMENT. CONTAMINATED LIQUIDS AND MATERIAL MUST BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE RULES AND REGULATIONS.



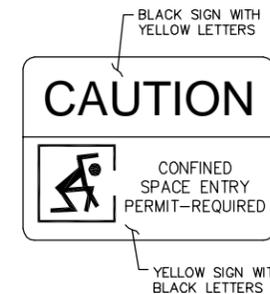
OIL/WATER SEPARATOR REHAB PLAN
SCALE: 1/2" = 1'-0"
C3.3
C3



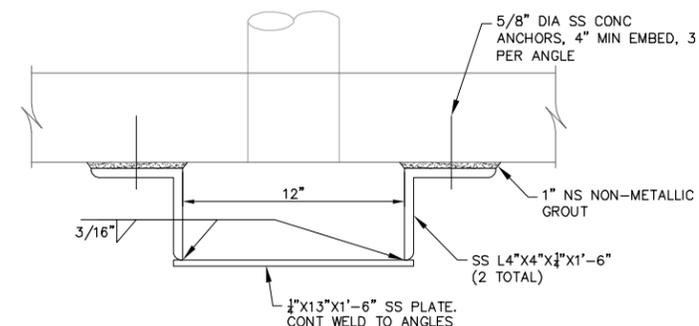
OIL/WATER SEPARATOR REHAB SECTION
SCALE: 1/2" = 1'-0"
C3.4
C3



OIL/WATER SEPARATOR TRENCH DRAIN INLET DETAIL
SCALE: 3/4" = 1'-0"
C3.5
C3



24"x18" TWO-COLOR, ENGRAVED PHENOLIC SIGN BOLTED TO CONC COVER.
CAUTION: CONFINED ENTRY SIGN
SCALE: NTS
C3.6
C3



SS BAFFLE DETAIL
SCALE: NTS
C3.7
C3

File: V:\PROJECTS\CHINA\22714\CADD\ACAD\DWG\PRODUCTION\C3.DWG
Saved: 6/10/2011 4:18:34 PM Plotted: 6/14/2011 11:14:53 AM User: Hodges, Chris LastSavedBy: 3771

No.	Submittal / Revision	App'd By	Date
1	BID ISSUE	GTS	5/12/11
2	BID ISSUE REVISED	GTS	6/8/11

CITY OF DURHAM, NC

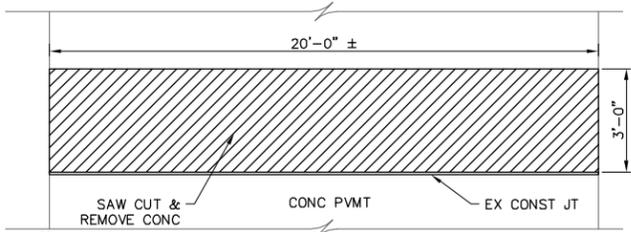


1155 Kildare Farm Road, Suite 200 - Cary, NC 27511-4877
Phone: (919) 657-0222 - www.chincorporates.com
NC Engineering License F-1165

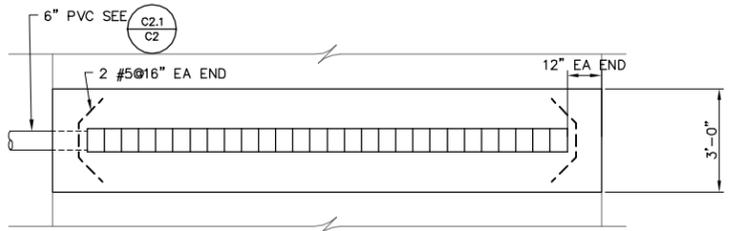
Designed: GTS
Drawn: MUMCCH
Checked: JSR

TRANSFER STATION RENOVATION
OIL/WATER SEPARATOR REHAB PLAN & SECTION
Issue Date: 5/6/11
Project No.: 22714
Scale: AS SHOWN

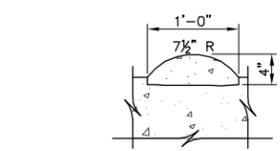
C3



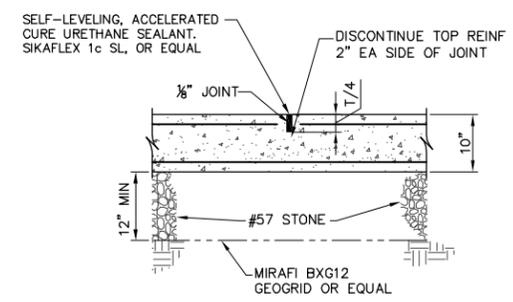
NEW TRENCH DRAIN DEMO PLAN
SCALE: 3/8" = 1'-0"
C4.1
C2



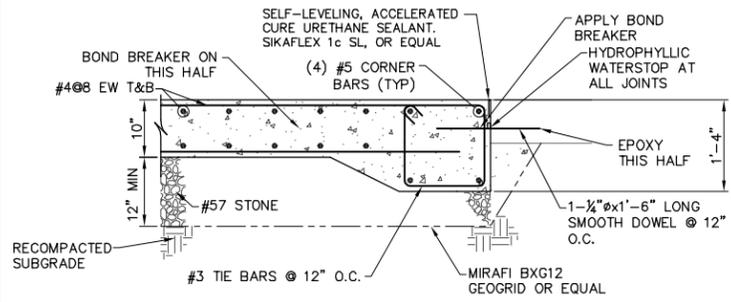
NEW TRENCH DRAIN PLAN
SCALE: 3/8" = 1'-0"
C4.2
C2



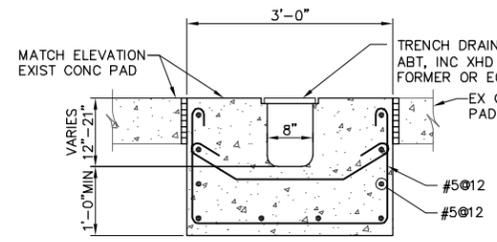
ACCESS ROAD DIVERSION BERM DETAIL
SCALE: 1" = 1'-0"
C4.3
C2



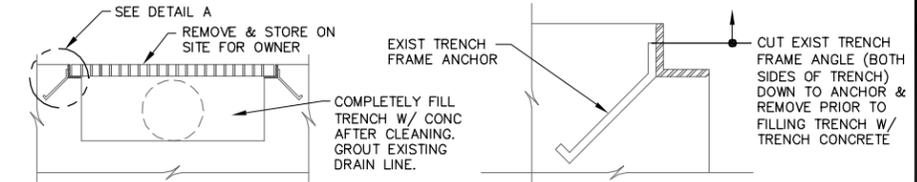
TYPICAL CAST-IN-PLACE CONCRETE CONTROL JOINT - CLJ
SCALE: 3/4" = 1'-0"
C4.4
C2



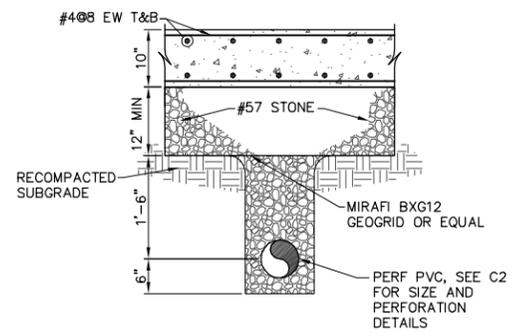
TYPICAL CAST-IN-PLACE CONCRETE CONSTRUCTION JOINT - CJ
SCALE: 3/4" = 1'-0"
C4.5
C2



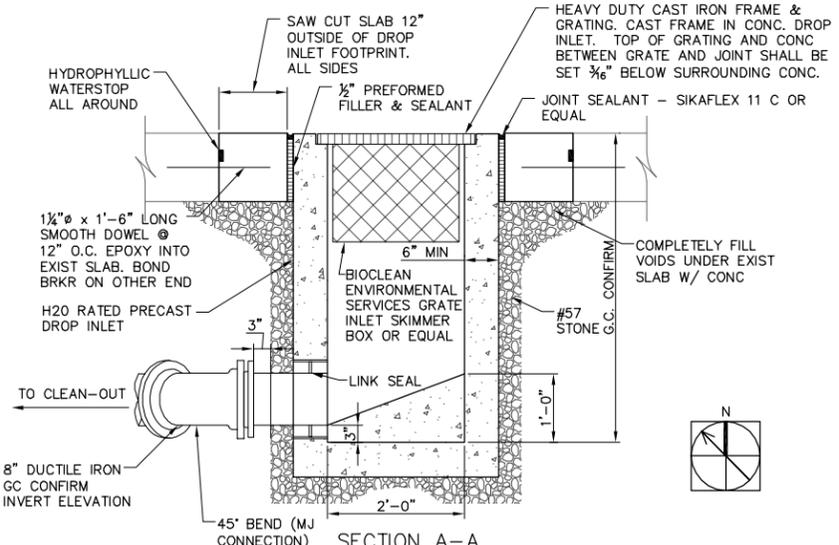
NEW TRENCH DRAIN SECTION
SCALE: 3/4" = 1'-0"
C4.6
C2



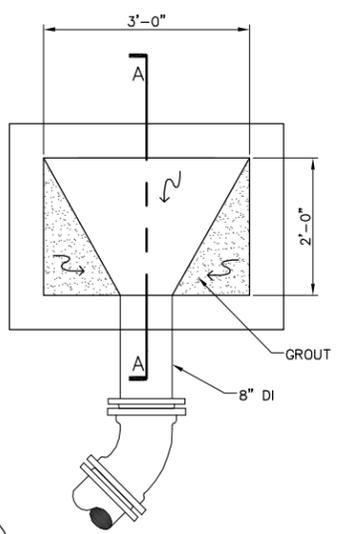
EXIST TRENCH DRAIN DEMO DETAIL
SCALE: 1" = 1'-0"
C4.7
C2



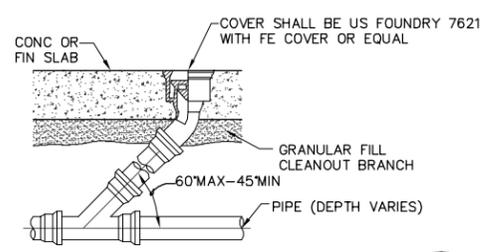
TYPICAL CAST-IN-PLACE CONCRETE SLAB SECTION
SCALE: 3/4" = 1'-0"
C4.8
C2



TIPPING FLOOR DROP INLET DETAIL
SCALE: 3/4" = 1'-0"
C4.9
C2



STORM DRAIN DETAIL
SCALE: NTS
C4.10
C2



BELOW SLAB CLEANOUT DETAIL
SCALE: NO SCALE
C4.11
C2

- NOTES:**
- EXCAVATE UNSUITABLE MATERIALS (IF ANY) TO DEPTHS AS REQUIRED AND APPROVED BY SITE ENGINEER. BACKFILL ALL OVEREXCAVATIONS IN ACCORDANCE WITH PARAGRAPH 2.6 ON DRAWING G3.
 - PROVIDE TEMPORARY DEWATERING MEASURES AS REQUIRED FOR SUBGRADE STABILIZATION AND/OR INSTALLATION OF THE SUBGRADE DRAINAGE SYSTEM.

No.	Submittal / Revision	App'd	By	Date
1	BID ISSUE	RCS	GTS	5/12/11
2	BID ISSUE REVISED	RCS	GTS	6/6/11

CITY OF DURHAM, NC



CLA
1195 Kildare Farm Road, Suite 200 - Cary, NC 27511-4877
Main: (919) 657-0222 • www.chicomp.com
NC Engineering License F-1165

Designed: GTS | Drawn: MUMCCH | Checked: JSR

TRANSFER STATION RENOVATION
CAST-IN-PLACE CONCRETE SLAB DETAILS
Issue Date: 5/6/11 | Project No.: 22714 | Scale: AS SHOWN

C4

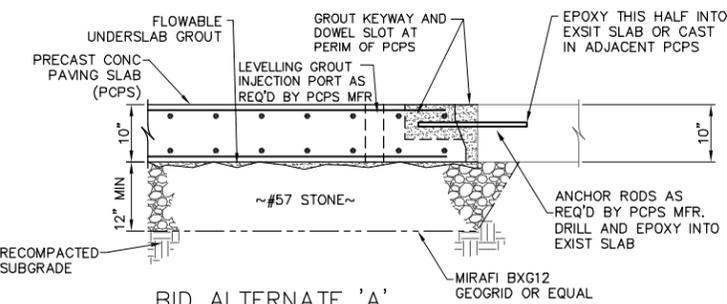
File: V:\PROJECTS\CHINA\22714\CADD\ACAD\VP\PRODUCTION\C4.DWG
Saved: 6/10/2011 4:21:40 PM Plotted: 6/14/2011 11:15:28 AM User: Hodges, Chris LastSavedBy: 3771

PRECAST CONCRETE PAVING SLAB SPECIFICATIONS: (BID ALTERNATE 'A')

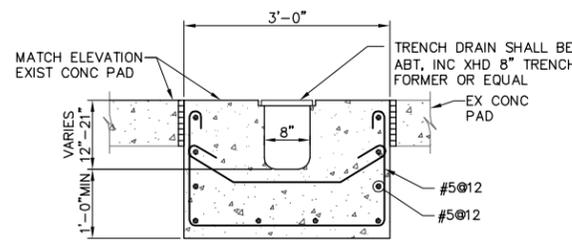
- PART 1 GENERAL**
- 1.1 SPECIFICATION INCLUDES:
- REMOVE FULL PANELS OF EXISTING CONCRETE PAVEMENT.
 - PREPARE BASE TO RECEIVE PRECAST CONCRETE PAVING SLABS (PCPS).
 - INSTALL SHEAR TRANSFER DOWELS, TIE BARS AND PCPS.
 - INSTALL LEVELLING GROUT TO ENSURE FULL SLAB SUPPORT.
 - INSTALL ENCASEMENT GROUT IN ALL KEYWAYS AND SEAL JOINTS.
 - SURFACE GRINDING.
- 1.2 DEFINITIONS
- PRECAST CONCRETE PAVING SLABS (PCPS): PORTLAND CEMENT CONCRETE PAVEMENT SECTIONS MANUFACTURED OFFSITE UNDER CONTROLLED CONDITIONS. THESE PAVEMENT SECTIONS ARE PART OF AN OVERALL SYSTEM DESIGNED FOR RAPID INSTALLATION IN THE FIELD.
- 1.3 SUBMITTALS
- A DETAILED LOCATION AND PHASING PLAN FOR THE PRECAST SLAB REPLACEMENT COORDINATED WITH THE OPERATING HOURS OF THE FACILITY AND SCHEDULED FACILITY DOWN TIME.
 - MANUFACTURER'S PRODUCT DATA AND SPECIFICATIONS AND MANUFACTURING TOLERANCES.
 - A HISTORY OF SUCCESSFUL INSTALLATIONS ON INTERSTATE OR OTHER INDUSTRIAL-TYPE FACILITIES WITH LOCATIONS, DATES, AND QUANTITIES TO BE VERIFIED BY THE ENGINEER.
 - TRANSVERSE JOINT TYPE, LOCATIONS AND SPACING, AND THE MECHANISM USED TO TRANSFER LOADS ACROSS THE JOINT FROM ONE PLANK TO ANOTHER.
 - STEEL REINFORCEMENT DETAILS.
 - LIFTING INSERT TYPE LOCATION, POSITIONS, AND GROUT CAPPPING METHOD.
 - GROUT, PORT TYPE, LOCATION, POSITIONING, AND GROUT CAPPPING METHOD.
 - MATERIALS PROPERTIES FOR THE CONCRETE, BEDDING FILL, AND BEDDING AND GROUTING MATERIALS.
 - RECOMMENDED INSTALLATION INSTRUCTIONS. INCLUDE RECOMMENDED INSTRUCTIONS FOR PREPARING THE BASE, INSTALLING THE SLAB, INSTALLING AND ENCASING HARDWARE, AND FOR BEDDING LEVELING SLABS TO ENSURE COMPLETE AND STABLE SUPPORT OF THE SLAB.

- PART 2 PRODUCTS**
- 2.1 PRECAST CONCRETE PAVING SLABS (PCPS):
- MANUFACTURED BY A PRECAST SUPPLIER CERTIFIED TO FURNISH MATERIALS TO VDOT OR AT LEAST 3 OTHER STATE DOT'S.
 - CONCRETE:
 - 28-DAY COMPRESSIVE STRESS: 4,500 PSI
 - 28-DAY FLEXURAL STRESS: 650 PSI
 - PORTLAND CEMENT: ASTM C150 TYPE I/II.
 - FLY ASH: ASTM C618, CLASS F (MAX 25% BY WEIGHT)
 - COARSE AGGREGATE: ASTM C33 (#57 OR #67 STONE)
 - FINE AGGREGATE: ASTM C33
 - TOTAL AIR CONTENT: 6% ± 1% (ASTM C260)
 - WATER-CEMENTITIOUS MATERIAL RATIO: 0.45 MAX
 - WATER REDUCING ADMIXTURES: ASTM C494, TYPES A THROUGH E
 - REINFORCING STEEL:
 - REINFORCING BARS: ASTM A615, GRADE 60
 - WELDED WIRE FABRIC: ASTM A185, Fy = 60 KSI
 - BASE MATERIAL: #57 STONE TOPPED WITH 6" VDOT #21A OR B.
 - BEDDING MATERIAL: SHALL BE FINELY GRADED MATERIAL THAT COMPACTS UNIFORMLY AND FORMS A STABLE AND PERMANENT PLATFORM PROVIDING UNIFORM SUPPORT TO THE SLAB WITH A FINAL GRADE TOLERANCE OF 1/8 INCH. AVERAGE LAYER THICKNESS SHOULD NOT EXCEED 3/8 INCH.
 - UNDERSLAB GROUT - USE ONE OF THE FOLLOWING MATERIALS:
 - A STABILIZING GROUT DEVELOPING A MINIMUM COMPRESSIVE STRENGTH OF 200 PSI WITHIN 12 HOURS AND 600 PSI WITHIN 7 DAYS AS DEMONSTRATED BY A TRIAL BATCH TESTING. GROUT SHALL USE TYPE I/II PORTLAND CEMENT CONCRETE, FLUIDIZING ADMIXTURE AND WATER. FORMULATE MIX TO PROVIDE HIGH FLUIDITY AND ALSO OBTAIN INITIAL SET WITHIN 4 HOURS.
 - A URETHANE POLYMER GROUT THAT REACHES 90 PERCENT OF ITS FULL COMPRESSIVE STRENGTH WITHIN 15 MINUTES OF PLACEMENT AND OBTAINS THE FOLLOWING CURED PROPERTIES:
 - COMPRESSIVE STRENGTH (ASTM D1621): 60-130 PSI.
 - FLEXURAL STRENGTH (ASTM D790): 18-180 PSI.
 - SHEAR STRENGTH (ASTM C273): 60-130 PSI.
 - ENCASEMENT GROUT - USE A NON-SHRINK, NON-METALLIC GROUT CAPABLE OF REACHING A COMPRESSIVE STRENGTH OF 2,500 PSI PRIOR TO EXPOSING IT TO TRAFFIC AS DEMONSTRATED BY TRIAL BATCH TESTING. ENCASEMENT GROUT MUST BE APPROVED BY THE ENGINEER BEFORE PLACEMENT.
 - JOINT SEALANT SHALL BE ONE COMPONENT HOT Poured URETHANE SEALANT RATED FOR TRAFFIC EXPOSURE.

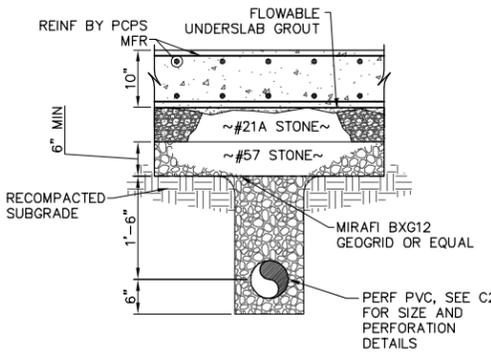
- PART 3 EXECUTION**
- 3.1 PREPARATION:
- VERIFY LOCATION, QUANTITY, SIZES AND SHAPES OF THE PRECAST SLABS REQUIRED WITH THE ENGINEER.
 - DEVELOP A PHASING PLAN THAT DETAILS:
 - SAW-CUTTING AND REMOVAL OF EXISTING SLABS.
 - STAGING AREA AND PLACEMENT OF PRECAST SLABS.
 - UNDERSLAB GROUT INSTALLATION.
 - HARDWARE INSTALLATION AND ENCASEMENT GROUTING.
 - GROUT PORT CAPPING AND SEALING.
 - SURFACE DIAMOND GRINDING.
- 3.2 PRE-PLACEMENT CONFERENCE AND TECHNICAL ASSISTANCE
- CONVENE A PRE-PLACEMENT CONFERENCE 7 TO 14 CALENDAR DAYS BEFORE THE PLANNED START OF SLAB DEMOLITION WITH INSTALLATION CONTRACTOR, ENGINEER, MANUFACTURER, INSPECTORS AND ANY RELEVANT SUBCONTRACTORS TO REVIEW AND COORDINATE ALL ASPECTS OF PLACEMENT AND INSPECTION INCLUDING PERSONNEL REQUIREMENTS.
- 3.3 REMOVE DAMAGED CONCRETE SLABS
- PROTECT THE WORK AREA WITH APPROPRIATE BARRICADES, STANDARD TRAFFIC CONTROL DEVICES IN ORDER TO KEEP AT LEAST 2 OF THE 4 BAYS IN OPERATION AT ALL TIMES.
 - REMOVE PANELS OR PANEL SECTIONS AS FOLLOWS:
 - DETERMINE EXTENT AND DIMENSIONS OF THE REPAIR IN COOPERATION WITH THE ENGINEER.
 - COMPLETE REMOVAL AND MAKE FULL DEPTH CUTS AROUND THE PERIMETER OF THE SECTION TO BE REMOVED. MINIMIZE OVERCUTS AND REPAIR THEM IMMEDIATELY WITH AN ENGINEER APPROVED EPOXY REPAIR MATERIAL. REMOVE PANELS BY LIFT-OUT METHOD. USE CHAINS AND LIFT PINS TO FACILITATE REMOVAL AND MINIMIZE DISTURBANCE TO THE BASE MATERIAL.
 - REMOVE AND DISPOSE OF ALL LOOSE PARTICLES OF OLD CONCRETE, DEBRIS, ETC BEFORE PLACING NEW PCPS.
- 3.4 PREPARE PCPS BASE
- INSTALL UNDERSLAB DRAIN SYSTEM, RECONSTRUCT THE BASE TO PROPER GRADE AND COMPACT TO SPECIFICATIONS.
 - REMOVE ANY EXCESS MATERIAL FROM AROUND THE EDGES OF THE EXCAVATION.
- 3.5 PLACE PRECAST SLABS
- ENSURE COMPLETE REMOVAL OF ANY CURING COMPOUND OR OTHER DELETERIOUS MATERIALS FROM DOWEL BAR BLOCK-OUTS, SAW CUT SLOTS, AND OTHER BONDING SURFACES BY SANDBLASTING OR OTHER METHOD APPROVED BY ENGINEER.
 - PLACE GRADE SUPPORTED SLABS IN MAXIMUM CONTACT WITH THE BEDDING MATERIAL. REMOVE AND REGRADE AS NECESSARY TO ACHIEVE MAXIMUM CONTACT.
 - REMOVE AND RESET PRECAST SLABS WHERE THE SURFACE OF THE PCPS IS:
 - BELOW THE SURFACE OF THE SURROUNDING SLABS, OR;
 - GREATER THAN 1/4 INCH ABOVE THE SURROUNDING SLABS.
 - TRANSVERSE JOINTING IN THE PRECAST SYSTEM SHOULD MATCH THE TRANSVERSE JOINTING TYPE AND PATTERN.
 - PROTECT PANELS AND EQUIPMENT FROM DAMAGES UNTIL INSTALLATION IS COMPLETE. REMOVE DEBRIS FROM JOINTS AND BLOCKOUTS AS NECESSARY.
 - REMOVE AND REPLACE DEFECTIVE OR DAMAGED PCPS AT NO ADDITIONAL COST TO THE OWNER.
- 3.6 INSTALL DOWEL BARS, TIE BARS, AND OTHER HARDWARE
- INSTALL ENCASEMENT GROUT SPECIFIED IN PARAGRAPH 2.6. VERIFY GROUT STRENGTH USING FIELD CURED CYLINDERS OR CUBES TO THE SATISFACTION OF THE ENGINEER. IF DAMAGE OCCURS UNDER TRAFFIC DUE TO LOW STRENGTH, REPAIR THE INSTALLATION TO THE SATISFACTION OF THE ENGINEER.
- 3.7 SEAL JOINTS
- ENSURE THAT JOINTS AND BONDING SURFACES ARE FREE FROM DELETERIOUS MATERIALS THAT MAY PREVENT ADEQUATE BONDING.
 - SEAL ALL TRANSVERSE JOINTS GREATER THAN 1/2 INCH AND LONGITUDINAL JOINTS GREATER THAN 3/4 INCH WITH ENCASEMENT GROUT.
 - SEAL ALL OTHER JOINTS WITH HOT-POURED JOINT SEALANT. FOR JOINTS NARROWER THAN 1/8 INCH, SAW CUT TO OPEN JOINT TO PROPERLY RECEIVE THE HOT-POURED SEALANT.
 - SEAL ALL CORE HOLES WITH ENCASEMENT GROUT OR HOT-POURED SEALANT AS APPROVED BY ENGINEER.
- 3.8 INSTALL UNDERSLAB GROUT
- INSTALL THE UNDERSLAB GROUT FOR GRADE-SUPPORTED SLABS WITHIN 12 HOURS OF SEALING JOINTS AND PLACING ALL ENCASEMENT GROUT.
 - PROVIDE EQUIPMENT CAPABLE OF ACCURATELY MEASURING AND PROPORTIONING BY VOLUME OR WEIGHT THE VARIOUS MATERIALS COMPOSING THE GROUT. PROVIDE EQUIPMENT TO ALLOW CONTROLLED AND CONTINUOUS INJECTION OF THE GROUT AT LOW PRESSURES, WITH A POSITIVE CUT-OFF VALVE AT THE NOZZLE.
 - INSTALL THE UNDERSLAB GROUTING WITH MINIMAL PRESSURE, APPROXIMATELY 5 TO 10 PSI, TO FORCE THE GROUT BENEATH THE PAVEMENT SLAB. ATTEMPT TO PUMP GROUT AT EACH GROUT PORT. FOR GRADE-SUPPORTED INSTALLATIONS, ENSURE THAT THE SLAB IS NOT LIFTED DURING GROUTING.
 - CAP GROUT PORTS AND LIFT INSERTS WITH ENCASEMENT GROUT OR EPOXY REPAIR MATERIAL AS APPROVED BY THE ENGINEER.
- 3.9 GRINDING
- GRIND THE INSTALLED PCPS AND ENCASEMENT GROUT TO ENSURE SMOOTH TRANSITION FROM PANEL TO PANEL. THIS WORK DOES NOT NECESSARILY HAVE TO BE COMPLETED PRIOR TO THE FACILITY GOING BACK INTO OPERATION, BUT SHALL BE COMPLETED WITHIN TWO WEEKS AFTER THE FACILITY IS BACK IN OPERATION.



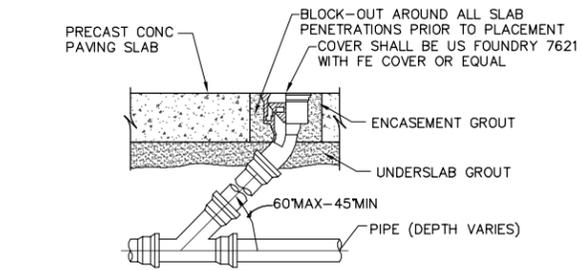
BID ALTERNATE 'A'
TYPICAL PRECAST CONCRETE PAVING SLAB CONSTRUCTION JOINT - CJ
 SCALE: 3/4" = 1'-0"
 C4A.5
 C2



NEW TRENCH DRAIN SECTION
 SCALE: 3/4" = 1'-0"
 C4A.6
 C2



TYPICAL PRECAST CONCRETE SLAB SECTION
 SCALE: 3/4" = 1'-0"
 C4A.8
 C2



BELOW SLAB CLEANOUT DETAIL
 SCALE: NO SCALE
 C4A.11
 C2

- NOTES:**
- EXCAVATE UNSUITABLE MATERIALS (IF ANY) TO DEPTHS AS REQUIRED AND APPROVED BY SITE ENGINEER. BACKFILL ALL OVEREXCAVATIONS IN ACCORDANCE WITH PARAGRAPH 2.6 ON DRAWING G3.
 - PROVIDE TEMPORARY DEWATERING MEASURES AS REQUIRED FOR SUBGRADE STABILIZATION AND/OR INSTALLATION OF THE SUBGRADE DRAINAGE SYSTEM.

No.	By	Date
1	GTS	5/12/11
2	GTS	6/6/11

CITY OF DURHAM, NC



1195 Kildare Farm Road, Suite 200 - Cary, NC 27511-4877
 Phone: (919) 667-0222 · www.chicompaines.com
 NC Engineering License F-1165

Checked: JSR
 Drawn: MUMCCH
 Designated: GTS

TRANSFER STATION RENOVATION

PRECAST CONCRETE PAVING SLAB DETAILS

Issue Date: 5/6/11 Project No.: 22714 Scale: AS SHOWN

C4A