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APPLICATION FOR PERMIT
CITRUS COUNTY TRANSFER STATION
(VOLUME I)

Dept. Of Environmental Protection
AUG 26 2009
Southwest District

submitted to the

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

in

June 2009
Revised August 2009

prepared for

CITRUS COUNTY
SOLID WASTE MANAGEMENT DIVISION
230 WEST GULF-TO-LAKE HIGHWAY
LECANTO, FL 34461

INSERTED INTO OCULUS
329297
SEP 15 2009
INITIAL

prepared by

KING ENGINEERING ASSOCIATES, INC.
4921 MEMORIAL HIGHWAY
ONE MEMORIAL CENTER
TAMPA, FLORIDA 33624

Christopher F. Kuzia
AUG 18 2009
FLPE NO. 45532

King
ENGINEERING ASSOCIATES, INC.

Morgan, Steve

From: Christopher F. Kuzler [CKuzler@kingengineering.com]
Sent: Tuesday, December 08, 2009 3:46 PM
To: Morgan, Steve
Subject: RE: Citrus Draft Transfer Station Comments
Attachments: revised quantities page changes accepted pdf; Replacement page 2-8 changes accepted.pdf

Here you go.

Also, on page 15, 8.h.,please consider changing the sentence "Removed solids and sediments from the drains shall be disposed of at the Class I landfill" to "Removed solids and sediments from the drains shall be disposed of at the Class I landfill or transfer station".

Thanks

"Morgan, Steve" <Steve.Morgan@dep.state.fl.us>

12/08/2009 03 33 PM

To "'Christopher F Kuzler'" <CKuzler@kingengineering com>
cc
Subject RE Citrus Draft Transfer Station Comments
Project(s)

Can you send me versions with the changes accepted

Please feel free to e-mail or call me if you have any further questions.

Steven G. Morgan, Solid Waste Section
Florida Department of Environmental Protection
Southwest District Office
13051 North Telecom Parkway
Temple Terrace, FL 33637-0926

phone - (813) 632-7600 x385
fax - (813) 632-7664
e-mail - steve.morgan@dep.state.fl us

From: Christopher F Kuzler [mailto:CKuzler@kingengineering.com]
Sent: Tuesday, December 08, 2009 2:56 PM
To: Morgan, Steve
Subject: RE: Citrus Draft Transfer Station Comments

I spoke with Carmen. Regarding the rolloff containers, the only time they would store a rolloff in the transfer station would be if, for some reason, they can't dump it (equipment breakdown, small load brought in at the close of business). The stored rolloff would be emptied at the start of the next business day. So the first sentence in paragraph 2 6.2 is still valid. The revised page is attached. I've also attached the revised quantities page from the Emergency Incidents Plan showing the oil tanks and anti-freeze to be 500 gallon tanks

Thanks for your help and let me know if you need anything else.

"Morgan, Steve" <Steve.Morgan@dep.state.fl.us>

12/08/2009 01 46 PM

To "'Christopher F Kuzler'" <CKuzler@kingengineering com>
cc
Subject RE Citrus Draft Transfer Station Comments
Project(s)

Chris:

I found where I got 450 gallon tanks. Appendix Three of the Emergency Incidents Plan lists the maximum quantities of the antifreeze and used oil tanks as 450 gallons If 500 gallons is correct, I need a replacement for this page. If 450 gallons is correct, I will reference that in the permit and no worry about changing plan sheets. Let me know what is correct

Please feel free to e-mail or call me if you have any further questions

Steven G. Morgan, Solid Waste Section
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phone - (813) 632-7600 x385
fax - (813) 632-7664
e-mail - steve morgan@dep.state.fl.us

From: Christopher F. Kuzler [mailto:CKuzler@kingengineering.com]
Sent: Tuesday, December 08, 2009 11:25 AM
To: Morgan, Steve
Subject: RE: Citrus Draft Transfer Station Comments

Make it 1:15 and I am sure to be back. 1:00 might be close.

"Morgan, Steve" <Steve.Morgan@dep.state.fl.us>

12/08/2009 11 18 AM

To "'Christopher F Kuzler'" <CKuzler@kingengineering com>
cc
Subject RE Citrus Draft Transfer Station Comments
Project(s)

I will call @ 1PM

Please feel free to e-mail or call me if you have any further questions.

Steven G. Morgan, Solid Waste Section
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The Department of Environmental Protection values your feedback as a customer DEP Secretary Michael W Sole is committed to continuously assessing and improving the level and quality of services provided to you Please take a few minutes to comment on the quality of service you received Simply click on this link to the DEP Customer Survey Thank you in advance for completing the survey

From: Christopher F. Kuzler [mailto:CKuzler@kingengineering.com]
Sent: Tuesday, December 08, 2009 9:18 AM
To: Morgan, Steve
Subject: RE: Citrus Draft Transfer Station Comments

Steve, I am around all day. Call at your convenience. I just have to run out at 11:45.

"Morgan, Steve" <Steve.Morgan@dep.state.fl.us>

12/08/2009 09 11 AM

To "Christopher F Kuzler" <CKuzler@kingengineering com>
cc
Subject RE Citrus Draft Transfer Station Comments
Project(s)

Chris:

Can I call you or you call me later this morning or early this afternoon to briefly discuss your comments.

Please feel free to e-mail or call me if you have any further questions.

Steven G. Morgan, Solid Waste Section
Florida Department of Environmental Protection
Southwest District Office
13051 North Telecom Parkway
Temple Terrace, FL 33637-0926

phone - (813) 632-7600 x385
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e-mail - steve.morgan@dep.state.fl.us

-----Original Message-----
From: Christopher F. Kuzler [mailto:CKuzler@kingengineering.com]
Sent: Wednesday, December 02, 2009 4:46 PM
To: Morgan, Steve
Cc: Casey Stephens; Carmen Bruno; Lara Daly
Subject: Citrus Draft Transfer Station Comments

Steve, attached are our comments. Let me know if you want to discuss them.
Thanks for all your help.

----- Original Message -----

From: Elizabeth J. Lyle
Sent: 12/02/2009 04:20 PM EST
To: Christopher Kuzler

Subject: Permit

(See attached file: Citrus County Transfer Station 296143-001-SO-30 permit WACS #39859.Review COMMENTS.doc)

Morgan, Steve

From: Christopher F. Kuzler [CKuzler@kingengineering.com]
Sent: Tuesday, September 29, 2009 4:08 PM
To: Morgan, Steve
Cc: Susan Metcalfe@bocc.citrus.fl.us; casey.stephens@bocc.citrus.fl.us; Carmen Bruno@bocc.citrus.fl.us; Lara G. Daly; Bo.Bruner@CH2M.com
Subject: CORRECTION - Citrus County Transfer Station - WACS No. SWD/09/39859
Attachments: Attachment B Replacement Pages.pdf; Attachment A Replacement Pages.pdf

Sorry Steve, I incorrectly spelled Casey's last name in the revised Attachment A and B pages I sent this morning. Please accept these corrected documents as complete replacements for what I sent this morning. Thanks.

----- Forwarded by Christopher F Kuzler/King on 09/29/2009 04 01 PM -----

Christopher F. Kuzler
09/29/2009 09 03 AM

To Steve Morgan@dep state fl us
cc Susan Metcalfe@bocc citrus fl us, casey stephens@bocc citrus fl us, Carmen Bruno@bocc citrus fl us, Lara G Daly/King@kingengineering, Bo Bruner@CH2M com
Subject Citrus County Transfer Station - WACS No SWD/09/39859
Project(s) 4217-001-001

Steve, as requested, attached please find the following:

1. Revised pages of Attachment B, "Household Hazardous Waste Facility Standards and Emergency Incidents Plan", with Casey Stevens shown as the Division Director. Also, We have added operating procedures for the valves and sumps as Section VIII of the document.

2. Specification 02200

3. Sheet C-2.03

4. Page 9-1 of Attachment H, "Operations, Maintenance and Contingency Plan" revised to indicate that the Leachate System Inspection Report can be found in Attachment E.

5. Revised pages of Attachment A, "Emergency Incidents Plan", with Casey Stevens shown as the Division Director.

Thanks for your help with this and please let me know if you need anything else.

King
ENGINEERING ASSOCIATES, INC

SERVICES
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August 26, 2009

Dept. Of Environmental Protection
AUG 2[illegible] 2009
Southwest District

Mr. Steven Morgan, P.E
Solid Waste Section
Florida Department of Environmental Protection
Southwest District
13051 North Telecom Parkway
Temple Terrace, FL 33637

Re. Citrus County Solid Waste Transfer Station
and Associated Site Improvements
Pending Permit No 296143-001-S0/30, Citrus County
WACS No.. SWD/09/39859
Request for Additional Information (RAI) #1 Response

Dear Mr Morgan.

This submittal is a response to the Department's Request for Additional Information (RAI) dated July 2, 2009. The Department's comments are re-stated in bold followed by the response In support of this response, enclosed please find four (4) copies of each of the following

- Response letter and attachments,
- Revised Volume 1 – Revised Application Package containing only those portions that have been revised or added,
- Revised Volume 2 - Geotechnical Report signed and sealed; and,
- Revised Construction Drawings signed and sealed.

GENERAL

1. **Rule 62-701.320(7)(b), F.A.C. Application Form #62-701.900(4), Part A.4: The WACS ID # for this facility is SWD/09/39859. Please revise this Part accordingly. This comment has been made by the Department on several recent applications submitted by the applicant. Please update your records to reflect this as the DEP ID Number on future applications.**

   The FDEP ID number has been revised on page 1 of the referenced form, which is included in Volume 1 of this response package.

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PART B – ADDITIONAL INFORMATION (Rule 62-701.710(2), F.A.C.): Introduction - Rule 62-701.710(2)(a), F.A.C.:

2. **Please revise this section to also indicate that the facility accepts waste tires and to list the relocated waste tire facility as one of the proposed improvements to the facility. Please explain what will be stored in the "dry storage building".**

   The section has been revised to include waste tires and a description of what will be stored in the "dry storage building."

3. **This project includes the relocation of the waste tire facility permitted under Department Permit No. 126602-002-WT/02. Please note that prior to transferring waste tire collection operations to the new CSA area, the applicant will need to apply for a modification of Permit No. 126602-002-WT/02 to reflect the new location and any changes to the operation of the waste tire facility (including changes waste tire quantities on-site), proposed by this application, as applicable. *This comment is for informational purposes only and does not necessarily require a response.***

   Comment acknowledged.

4. **Construction Phasing- Phase 1: Please provide or revise an existing figure or plan sheet in this application to identify the proposed location where the "temporary yard waste processing area" will be constructed.**

   The section has been revised to cite the specific plan sheet (C1.04) on which the temporary yard waste processing area is shown.

Section 3 – Operation and Function of Processing Equipment (Rule 62- 701.710(2)(c), F.A.C.):

5. **Section 3a – Regular Facility Operations (Rule 62-701.710(2)(c)(1), F.A.C.):**

   a. **It does not appear that overhead lighting will be provided in the transfer station building. Please revise this section to indicate that waste acceptance and processing will not occur during non-daylight hours and during periods of time when inadequate lighting is provided through the proposed windows in the transfer station. Please also provide this information in Section 1.2 of the Operation Plan.**

      The proposed transfer station lighting is shown on Sheets E1 01, E1 02 and E1.03, which were not provided in the original submittal but are included herein for your reference Since lighting in the transfer station is proposed, no changes have been made in Part B or in the Operation Plan

6. **Section 3c – Potential Safety Hazards and Control Methods (Rule 62-701.710(2)(c)(3), F.A.C.):**

   a. **Fire Protection: Please revise this section to verify that the local fire authorities will review and approve the proposed fire system for the facility and/or will conduct an**

inspection of the system upon installation to verify that adequate fire protection has been provided in accordance with Rule 62-701.710(4)(e), F.A.C., prior to operation of the facility.

The section has been revised to state that the Fire Marshall must review and approve the fire protection system before the facility is placed into operation.

b. Unauthorized or Hazardous Materials:

1) Please revise this section and/or Section 6.2 of the Operation Plan to indicate that the Department will be notified in the event that a driver refuses to accept back unauthorized waste, when requested.

Both documents have been revised as requested.

2) Please revise this section and/or the appropriate section of the Operation Plan verify whether the "temporary holding area" for unauthorized waste will be located at a designated location in the transfer station or will be established on a daily basis.

Both documents have been revised as requested.

Section 4 – Design Requirements (Rule 62-701.710(3), F.A.C.):

7. Rule 62-701.710(3)(a), F.A.C.: The volume of waste proposed to be processing through the transfer station do not appear to warrant the need to park loaded transfer trailers outside leachate containment (i.e. in an area other than the transfer station tipping floor or tunnel) overnight. Please verify and revise this section and the appropriate section of the Operation Plan accordingly.

Both section 4 of Part B and section 2.6.1 of the Operation Plan have been revised to indicate that it is the County's intent that all trailers leave the site upon being loaded If absolutely necessary, waste not stored on the tipping floor or transported off-site will be stored in transfer trailers either covered with a tarp or parked in the transfer station, within an area served by the leachate collection system, until the next business day

8. Rule 62-701.710(3)(b), F.A.C.:

a. Please provide supporting calculations that existing leachate pump station is capable of handling the anticipated additional leachate generated by the proposed transfer station.

Supporting calculations are provided in Attachment J of Part B As shown the existing sources of leachate into the master pump station are the Phases 1, 1A and 2 active landfills and the closed 7-acre landfill. Leachate flow from these sources is continuous over a 24-hour period The maximum month of leachate generation in 2008 was August with a maximum total daily flow of 47,080 gallons. Over 24-hours, this represents an average flow rate of 32 7 gallons per minute, which is far less than the station's pumping capacity of 180

gallons per minute This flow is considered high, and is the result of the unusual rainfall associated with Tropical Storm Faye. This is illustrated by the significantly lower flows for the July and September of the same year.

The transfer station's leachate pump station is designed to pump at 80 gpm This flow rate was chosen in order to maintain a 2 ft/s scouring velocity in the 4-inch leachate force main. In reality, the transfer station is expected to generate a relatively small amount of leachate, with the highest amount being generated when the tipping floor is washed down once per week. This wash down is expected to take approximately 90 minutes using wash down nozzles with a design flow rate between 50 and 60 gallons per minute Therefore, over the 90 minute period, the calculated leachate generation flow rate is roughly 56 gallons per minute.

The capacity calculations indicate that using either the 56 gpm generation rate or the 80 gpm pumping rate for the transfer station results in a leachate master pump station excess capacity greater than 65 gpm This a conservatively low estimate given that the landfill leachate generation rate is based on the August 2008 unusually high volume

b. **Please verify whether, in the event leachate cannot be treated at the treatment plant, leachate from the transfer station would be loaded out for transport to a wastewater treatment plant at the lift station emergency pump-out connection or as described for the leachate management system for the landfill and revise this section and/or the applicable section of the Operation Plan, as applicable.**

As indicated in section 4 of Part B, and in Section 9 of the Operating Plan, If the leachate cannot be treated at the on-site leachate plant, it will be transported to one of the County's wastewater treatment plants

Section 6 – On-Site Storage Areas for Recyclables Materials, Non Processible Wastes and Residues (Rule 62-701.710(2)(e), F.A.C.):

9. **Please revise this section to indicate that tires will be managed at the CSA in accordance with the facility's waste tire permit (see Comment #3).**

The section has been revised as requested

Section 12 – Stormwater Management (Rule 62-701.710(8), F.A.C.):

10. **Attachment K:**

a. **There appears to be the potential for discharge of contaminants from solid waste processing and storage activities in the CSA and HHW into the stormwater management system. Please verify whether these operation activities were considered and addressed in the ERP permit modification and/or provide documentation from the ERP section that no additional modification of the ERP permit is required for these activities. Alternatively, please provide a revised ERP permit modification that addresses these issues.**

As described in our original submittal cover letter, the County's existing Best Management Practices (BMPs) for addressing potential leachate from solid waste processing and storage activities in the CSA and HHW were discussed and found acceptable to the Department's ERP section. These BMPs are described in the Transfer Station Operations Plan As such, these operations are considered and addressed in the ERP permitting process. The ERP has been deemed complete as discussed in comment 10b response. A copy of the Department's ERP application completeness letter is enclosed as **Attachment 1** to this response. A copy of the permit will be provided upon issuance.

b. Please provide a copy of the ERP permit modification upon issuance and, as applicable, either a copy of the permit drawings referenced in the ERP permit or references to the corresponding drawings provided in the construction plan set provided with this application.

The plans most recently submitted in ERP application package were the same as those submitted for this solid waste permit application A copy of the sheet index for the ERP submittal is included in **Attachment 1** to this response A copy of the Department's ERP application completeness letter is enclosed as **Attachment 1** to this response. A copy of the permit will be provided upon issuance

Section 14 – Proof of Publication (Rule 62-701.320(8), F.A.C.):

11. Please publish the attached Notice of Application and provide proof of publication to the Department.

A copy of the proof of publication is included in **Attachment 3** to this response

Section 15 – Conformance with Prohibition (Rule 62-701.300(2)(a), F.A.C.):

12. Rule 62-701.300(1)(b), F.A.C.: Please explain how the activities in the CSA and HHW will comply with this prohibition (see Comment #10.b.).

As described in our original submittal cover letter, the County's existing Best Management Practices (BMPs) for addressing potential leachate from solid waste processing and storage activities in the CSA and HHW were discussed and found acceptable to the Department's ERP section. These BMPs are described in the Transfer Station Operations Plan. As such, these operations are considered and addressed in the ERP permitting process. The ERP has been deemed complete as discussed in the response to comment 10b

Additionally, per our meeting on July 8, 2009, changes to the operation and configuration of the HHW floor drain collection system has been made per our discussion. These changes include a shutoff valve on the drain line within the unloading area, removal of the tank associated with this drain, and a resizing of the tank associated with the storage area trench drain. The revised construction plans, specifications, and operations plan are included as attachments to this response.

The proposed operations do not satisfy criteria making them subject to air permitting and, as such, should not violate air quality standards.

13. Rule 62-701.300(8)(a), F.A.C.: It is unclear whether lead-acid batteries discovered at the transfer station will be isolated and removed from the facility separate from the lead-acid battery management at the HHW facility. Please verify and revise this section accordingly.

Lead-acid batteries discovered in the waste at the transfer station will be stored in the tipping floor unauthorized waste holding area and then moved to the lead-acid storage area at the HHW by the end of the business day. This has been clarified in section 15 of Part B and in Section 6 of the Operating Plan.

Attachment C – Site Plan:

14. Please revise Attachment C, as applicable, based on your responses to comments on Sheet C3.00 of the Construction Drawings.

Attachment C has been revised to include sheet C6.00 as further discussed in comment response 18 Sheet C3 00 has been revised as needed as a result of this RAI response.

Attachment H - Operation, Maintenance and Contingency Plan (Rule 62- 701.710(9), F.A.C.):

15. Introduction:

a. **It is indicated in Section 9 of the Engineering Report and in this section that Attachment H will become an appendix of the Class I landfill Operation Plan. Please note that the Table of Contents of the Class I Operation Plan will need to be amended as part of the below noted modification of the Class I operation permit to reflect the additional appendix to the plan. *This comment is for informational purposes only and does not necessarily require a response.***

Per our meeting on July 8, 2009, the revised Operations Plan for the transfer station will be a stand-alone document As such, no changes to the Landfill Operations Plan are necessary Changes to the Landfill Operations Plan necessary to reflect the new transfer station operations will be made as part of the County's upcoming Landfill Permit renewal process.

b. **Throughout Attachment H, there are numerous references to specific sections of the existing Class I landfill Operation Plan and/or references to procedures in that plan, in lieu of providing the information in Attachment H. As indicated in several comments below, a review of the existing Class I Operation Plan reveals that the referenced sections and/or narrative procedures may either not reference the operation of the transfer station, CSA, and related operational a ctivities or may describe procedures inconsistent with the proposed operation of the transfer station, CSA and related operation activities in this application. Such inconsistencies shall require the submittal of an application for modification of the existing Class I operation permit to revise the Class I Operation Plan accordingly and may require issuance of such modification prior to issuance of the transfer station permit. Please review the Class I Landfill Operation Plan accordingly, and either submit a minor**

permit modification application of the Class I Operation Permit or revise Attachment H to serve as a stand-alone operation plan for the transfer station and related operation activities.

Per our meeting on July 8, 2009, the revised Operations Plan for the transfer station will be a stand-alone document As such, no changes to the Landfill Operations Plan are necessary at this time. The Transfer Station Operation Plan has been modified using track changes to easily see where changes to the text have occurred

16. **Section 1.1: Please revise this section to also list the permitted waste tire facility as one of the co-located facilities.**

    The section has been revised as requested.

17. **Section 1.2: Please revise the appropriate section of the Operation Plan to specifically describe the procedures for unloading waste at the "selfhaul unloading area" at the transfer station.**

    The section has been revised as requested.

18. **Figure 1-1: Please revise Figure 1-1 to identify each of the individual waste storage and processing areas in the CSA and HHW facility (e.g. tires, white goods, scrap metal, paints, electronics, used oil, antifreeze, etc.)**

    Plan sheet C6.00 has been revised to include this information and added as Figure 1-2 to the Operations Plan Figure 1-1 has been revised as needed as a result of this RAI response.

19. **Section 2.1: The operator and spotter training requirements for a waste processing facility (i.e. transfer station) are inconsistent with those for a Class I landfill. Please revise this section and the Landfill Operation Plan, as applicable. Please note that initial Class I landfill operator training cannot substitute for required initial waste processing facility operator training.**

    As discussed at our meeting on July 8, 2009, it was agreed that the spotter training requirements are the same for landfills and transfer stations The training for operators is different; therefore, the Operation Plan has been revised to require the correct training

20. **Section 2.2.: Please note that the Landfill Field Crew Leader and Customer Service Supervisor shall be certified waste processing facility operators to have overall responsibility for operation of the transfer station and related operations. *This comment is for informational purposes only and does not necessarily require a response.***

    Comment acknowledged

21. **Section 2.3.: Please revise this section, where applicable, to discuss contingency operations for emergencies for the CSA and HHW facility.**

    The Operation Plan has been revised as requested

22. Section 2.3.1: Please revise Appendix A of the Landfill Operation Plan, as appropriate, to include the transfer station, CSA, and HHW facility operations.

An Emergency Incidents Plan has been developed specifically for the CSA, HHW and Transfer Station and is included as Appendix A of the Transfer Station Operation Plan. A Facility Standards and Emergency Incidents Plan more specific to the Household Hazardous Waste facility is provided in Appendix B of the Transfer Station Operation Plan. This Hazardous Waste Facility Standards and Emergency Incidents Plan is based on the County's existing and approved plan, modified to address the proposed facility.

23. Section 2.3.3: Please revise this section and/or Section 2.3.3 of the Landfill Operation Plan, as appropriate, to include the transfer station, CSA, and HHW facility operations, and to be consistent with the Section 3 of the Engineering Report.

The Operation Plan and Section 3 of the Engineering Report (Part B) have been revised as requested

24. Section 2.4:

a. Please revise this section to explain the procedures if the scale house attendants notes unacceptable wastes in an incoming load.

Section 2 4 has been revised as requested.

b. Please revise this section to expand the list of unacceptable waste at the transfer station to include prohibited items listed in Rule 62-701.300(5) though (8), (10), and (12), F.A.C.

Section 2.4 has been revised as requested

c. Please revise this section to verify that the CSA can accept "household" hazardous wastes.

Section 2 4 has been revised as requested

d. Please revise Section 2.4 of the Landfill Operation Plan, as appropriate, to include the transfer station, CSA, and HHW facility operations.

Per comment response 15, no changes to the Landfill Operation Plan have been made.

e. Section 1 of the Engineering Report and Section 2.4 of the Landfill Operation Plan indicate that the HHW facility will accept Conditionally Exempt Small Quantity Generator (CESQG) waste. Please note that the Department's Hazardous Waste Section may need to be notified and approve the acceptance of CESQG waste. Please contact Beth Knauss, at 813-632-7600 x383, to determine if notification and approval is required. Please revise Section 2.4 of the Landfill Operation Plan, as applicable.

As discussed during our meeting on July 8, 2009, the current permit allows for acceptance of CESQG waste. Notification upon receipt of larger than usual quantities will continue according to permit requirements Per comment response 15, no changes to the Landfill Operation Plan have been made, however additional information on the acceptance of CESQG waste is provided in the HHW Facility Standards and Emergency Incidents Plan.

25. **Section 2.5: Please revise this section to provide a more detailed description of waste unloading at the "self-hauling unloading area".**

    Section 2 5 has been revised as requested

26. **Section 2.6.2: Please verify that the reference to the "transfer station of the landfill" is a typographic error and revise this section accordingly.**

    The reference to "transfer station of the landfill" is a typographical error and has been corrected to read "transfer station or the landfill".

27. **Section 2.7: Please verify that the reference to Section 7 of the Landfill Operation Plan is a typographic error and revise the applicable section of the Landfill Operation Plan, as appropriate, to include the transfer station, CSA, and HHW facility operations.**

    The reference to Section 7 is a typographical error and has been corrected. Per comment response 15, no changes to the Landfill Operation Plan have been made; however, the Transfer Station Operation Plan has been revised to include the necessary information.

28. **Section 3: The operation records in Section 3 of the Landfill Operation Plan appear inconsistent with records typically maintained and reported for transfer station, CSA, and HHW facility operations. Please verify and revise Section 3 of the Landfill Operation Plan, as appropriate.**

    Per comment response 15, no changes to the Landfill Operation Plan have been made, however, Section 3 of the Transfer Station Operation Plan has been revised to include the necessary information.

29. **Section 4: The waste records in Section 4 of the Landfill Operation Plan appear inconsistent with waste records typically maintained and reported for transfer station, CSA, and HHW facility operations and do not appear to include all waste types proposed to be accepted at the transfer station, CSA, and HHW facility. Please verify and revise Section 4 of the Landfill Operation Plan, as appropriate.**

    Per comment response 15, no changes to the Landfill Operation Plan have been made; however, Section 4 of the Transfer Station Operation Plan has been revised to include the necessary information

30. **Section 5: Please revise Section 5 of the Landfill Operation Plan, as appropriate, to reference the transfer station, CSA, and HHW facility operations.**

Per comment response 15, no changes to the Landfill Operation Plan have been made, however, Section 5 of the Transfer Station Operation Plan has been revised to include the necessary information.

31. Section 6.1:

a. This section refers to waste inspection accordance with Section 6.1 of the Landfill Operation Plan. Please verify whether the load checking procedures in Section 6.1 of the Landfill Operation Plan will be implemented for incoming loads to the transfer station and CSA.

Section 6 1 of the Transfer Station Operation Plan has been modified to show similar waste inspection procedures to that of the Landfill

b. The narrative description of waste inspection in Section 6.1 of the Landfill Operation Plan appears inconsistent with waste inspection procedures at a transfer station, CSA, and HHW facility. Please verify and revise Section 6.1 of the Landfill Operation Plan, as appropriate.

Per comment response 15, no changes to the Landfill Operation Plan have been made; however, Section 6.1 of the Transfer Station Operation Plan has been revised to include the necessary information.

32. Section 7: Please verify that the reference to Section 9 of the Landfill Operation Plan is a typographic error and revise Section 10 of the Landfill Operation Plan, as appropriate, to include the transfer station, CSA, and HHW facility operations.

The reference to Section 9 is a typographical error. Per comment response 15, no changes to the Landfill Operation Plan have been made; however, the Transfer Station Operation Plan has been revised to include the necessary information Please note that the referenced Stormwater Operations and Maintenance Manual is included as **Attachment 2** to this response

33. Section 8: Please verify that the reference to Section 10 of the Landfill Operation Plan is a typographic error and revise Section 11 of the Landfill Operation Plan, as appropriate, to include the transfer station, CSA, and HHW facility operations.

The reference to Section 10 is a typographical error. Per comment response 15, no changes to the Landfill Operation Plan have been made; however, Section 8 of the Transfer Station Operation Plan has been revised to include the necessary information.

Attachment I – Technical Specifications (Rule 62-701.400(1), F.A.C.):

34. Special Conditions:

a. Part 1.0.B.1: Please revise this section include the submittal of certification of construction completion documentation to the Department as the one of the requirements of placing the Phase I constructed facilities into service.

The specification has been revised to include the requested information.

b. **Part 2.0.B.: Please revise this section clarify that contaminated concrete and steel, if applicable, may not be disposed of a recycling facility.**

The specification has been revised to include the requested information

35. **Section 02200 – Site Preparation:**

a. **Parts 3.01.A., 3.02.A.1., and 3.04.A.: Please verify that the references to the "limits of landfill" and "landfill limits" are typographic errors and revise these parts, as appropriate.**

The references are typographical errors and the specification has been revised.

b. **Part 3.08.A.1.: Please define the term "debris" in Part 1.01, and based on that definition, identify the type of "off-site facility" where the debris will be disposed.**

The specification has been revised to define "debris" as tree roots and construction debris and "facility" as properly permitted construction and demolition debris disposal facility

36. **Section 02240 – Dewatering: Please note that dewatering may require an Industrial Waste Permit from the Department. Please contact Ms. Yanisa Angulo, P.E., at 813-632-7600 x404, to determine if a permit is required.** ***This comment is for informational purposes only and does not require a response.***

Comment acknowledged Erosion Control Note #14 on Sheet G1 02 of the plans requires that the contractor obtain a Generic Permit for the Discharge of Produced Groundwater if dewatering activities occur on the site As discussed at our meeting, due to the depth of the groundwater table at the site, dewatering is not anticipated

37. **Section 02450 – Gravity Leachate Sewer Collection System & Force Main:**

a. **Part 1.02.A.: Specification Section 01300 referenced in this part does not appear to have been provided in Attachment I. Please verify and provide Section 01300, as appropriate.**

This reference should read Section 01340 and has been revised. Section 01340 and revised Section 02450 have been included in Volume 1 of this response package.

38. **Section 02451 – Duplex Submersible Leachate Pump Station:**

a. **Part 2.02.E.: The operational procedures in this part should be included in the transfer station Operation Plan in Attachment H. Please revise Attachment H accordingly.**

Per comment response 15, no changes to the Landfill Operation Plan have been made, however, Section 9 of the Transfer Station Operation Plan has been revised to include the necessary information.

b. Part 3.02.A.: Specification Section 01700 referenced in this part does not appear to have been provided in Attachment I. Please verify and provide Section 01700, as appropriate.

Section 01700 has been included in Volume 1 of this response package.

GEOTECHNICAL INVESTIGATION FOR THE PROPOSED CITRUS COUNTY SOLID WASTE TRANSFER STATION, DATED JUNE 2009, prepared by CH2M Hill (Rule 62-701.410, F.A.C.)

39. Section 1: Please verify the number of CPT soundings conducted for this project and revise this section, as appropriate (See Comment #41).

A total of 11 CPT soundings were made. CPT-6A was made at 5 feet offset from CPT-6 and CPT-8A was made at 5 feet offset from CPT-8. The report has been revised

40. Section 2 & Table 1: The list of proposed construction in this section appears to be inconsistent with all the proposed construction at the site (e.g. CSA, fuel storage area, yard waste area, etc). Please revise this section and Table 1 accordingly to describe all proposed construction. Please verify whether field exploration was conducted in all proposed construction areas at the site. If field exploration for a particular construction activity has not been conducted, please explain why such field exploration was not conducted.

Section 2 and Table 1 have been revised as requested.

41. Section 3.2: This section indicates that 9 CPT soundings were conducted as part of Phase II exploration. Figure 2 identifies 10 CPT sounding locations (A-1 through A-10). Appendix A provides CPT sounding logs for 11 soundings (A-1 through A-6, A-6A, A-7, A-8 & A-8A, and A-9). Please verify these apparent inconsistencies and revise this section, Figure 2, and Appendix A accordingly.

A total of 11 CPT soundings were made. Please see response to comment 39. The section and figure have been revised.

42. Section 4.0: Please revise this section to describe the field exploration conducted for all proposed construction activities (See Comment#40).

The field exploration conducted for all proposed construction has been described in Section 4

CONSTRUCTION PLAN SET TITLED – CITRUS COUNTY SOLID WASTE TRANSFER STATION and ASSOCIATED SITE IMPROVERMENTS (RULE 62-701.320(7)(f), F.A.C.)

43. Sheet G1.00:

a. **Structural Sheets: Please provide Sheet S0.01 and the listed structural sheets for the Transfer Station Building and Household Hazardous Waste Building not previously provided.**

These sheets have been added to the revised construction plan set submitted with this response

b. **Please provide Sheets A0.02 and A2.10.**

These sheets have been added to the revised construction plan set submitted with this response.

44. Sheet C2.03:

a. **This sheet shows "CSA & Yard Waste" exiting on the entrance road to the west of the 24-hour Recycling Center. Other sheets in this plan set show fencing across the road south of the Recycling Center. Please verify whether traffic from the CSA and Yard Trash Facility can exit via this west road. If exiting is an option along this road, please explain how access to the remainder of the facility by after-hours customers utilized the 24-hour Recycling Center is prevented. Please revise this sheet as applicable.**

CSA and Yard Waste customers can exit the site through this exit if they wish to visit the 24-hour Recycling Center. Otherwise, they may use the main entrance/exit. There is an existing gate at the exit to the 24-hour recycling center that will remain open during operating hours and will be closed when the facility is closed The existing gate has been annotated on sheet C3 02 of the revised plan set

b. **Please verify whether the eastbound "CSA Transfer (roll-offs)" arrow south of the transfer station is correct and revise this sheet as appropriate.**

This arrow was incorrectly facing east and has been revised

45. Sheets C3.00:

a. **Please revise this sheet to identify all proposed waste processing and/or storage areas, bins, and/or tanks at the facility. Alternatively, if this sheet becomes too cluttered to identify each designated area, then please revise Sheet C3.01 through C3.05 accordingly and provide a Figure(s) to replace the site plan in Attachment C of the Engineering Report and Figure 1-1 in the Operation Plan, which identifies all the waste storage and processing areas, bins and/or tanks.**

In lieu of adding the HHW info on sheets C3.01-3 05, sheet C6 00 has been revised to include this information, as it contains a blowup of the entire CSA and HHW area Changes to sheet C3 00 have been made as necessary to respond to this RAI. Figure 1-2 has been added to the Operation Plan as explained further in comment response 18.

46. Sheet C8.07:

a. **The invert elevations reported for LMH #1 on this sheet (113.10/113.00) appear inconsistent with gravity drainage of leachate to the leachate pump station based on the invert elevation of inlet pipes shown on Sheet M8.00 (113.20). Please verify and revise this sheet and/or Sheet M8.00, as appropriate.**

The plan sheet has been revised to correct the pipe slopes and inverts at LMH #1.

b. **The referenced to continuation on Sheet C6.08 for the "40 LF 8" HDPE Leachate" line on this sheet appear to be a typographic error. Please verify and revise.**

The text has been revised to refer to sheet C8.06

47. Sheets M3.00 through M3.02:

a. **Please be advised that the fueling station may require registration from the Citrus County Storage Tank Program. Please contact them to determine if registration is required. *This comment is for informational purposes only and does not require a response.***

Comment acknowledged

48. Sheets M5.00 & M5.01:

a. **Please explain from where the "Ex. 3" Leachate Transfer" line conveys leachate.**

As discussed during our meeting on July 8, 2009, this line is from the existing 7-acre closed landfill

49. Sheets M6.00 & M7.00:

a. **Please be advised that the Aerobic Drip Tape Septic System and Leach Field he E-One pump station may require a permit from the Citrus County Health Department Septic Tank Program. Please contact them to determine if a permit is required. *This comment is for informational purposes only and does not require a response.***

Comment acknowledged

50. Sheets M8.00:

a. **Typical Lift Station: The lift station emergency pump-out connection does not appear to be located within containment to prevent discharge of leachate during pump-out operations. Please verify and explain.**

The design has been modified to relocate the emergency pump-out connection inside the valve vault to provide the required containment. The valve vault drains back into the pump station wet well

b. Lift Station Emergency Pump-out Connection: Please verify the reference to Detail V-10 in the note for this detail and revise the note, as appropriate.

The Emergency Pump-out Connection detail has been deleted since the pumpout has been moved to the valve vault interior

51. Sheet S1.14:

a. Section K & Detail 2: Please identify and provide the plan sheet(s) that show where Section K and Detail 2 are located.

Section K is located on Sheet S1 04, and Detail 2 is located on Sheet S1.02

52. Sheet A1.03:

a. Please explain how leachate is prevented from discharging out the entrance to the self-hauling loading area and how waste is prevented from be dumped or spilled outside the transfer station Building during self-haul waste unloading (See Comment #17).

There is an overhead coiling door #10-104B on the east end of the Transfer Building, which is designated for self-hauler waste drop-off. The overhead door comes down onto a knee wall with a top elevation of + 142.65. This concrete wall will keep will keep leachate generated inside the building from leaving the tipping floor. The pad outside the building will be cleaned as needed to remove litter and waste that is dropped outside the building by self-haulers while unloading.

53. Sheet P2.01:

a. Please provide the referenced structural drawings for the trench in the electronics/paints/battery storage area.

The structural plan and detail drawings have been provided

b. Please verify that the waste oil tanks containment area has secondary containment for 110% of the largest tank (i.e. 550 gallons).

Secondary containment of 110% has been provided for the largest tank.

54. Sheet P4.01:

a. The use of underground storage tanks for runoff from the HHW drive-thru and the electronics/paint/battery storage areas, that potential could contain hazardous waste and be discharged to stormwater via the automatic pump system in the tanks appears problematic, may be or may result in violations of the Department Solid Waste and/or Hazardous Waste regulations, and should be discussed in detail during the meeting requested at the end of this letter. Please review and revise the design of

this system, as appropriate, based on the comments provided by the Department during the above referenced meeting.

Modified drawings have been provided.

b. **Please provide Detail 29-T-01 for the storage tanks and Detail 20- SP-02 for the sump pump and technical specifications for both, as applicable.**

Modified drawings have been provided. Specifications have been provided.

c. **Please identify the capacity of each storage tank, as applicable.**

Storage tanks have been deleted from the project. One 1100 gallon pump station has been added Modified drawings have been provided.

55. Sheet P6.01:

a. **Please provide similar plumbing diagrams, including inlet and outlet elevations, for the HHW drive-through floor drain system and the electronics/paint/battery storage area drainage system.**

Plumbing diagrams has been provided.

The County appreciates the Department's work on this project and hopes this additional information adequately addresses the Department's concerns Thank you for your continued cooperation, and contact me if additional information is needed.

Sincerely,

Christopher F. Kuzler, P E
Sr Vice President

CFK/vee

Attachments

cc: Susan Metcalfe, Citrus County Solid Waste (w/ attachments)
Carmen Bruno, Citrus County Solid Waste
Bo Bruner, P.E , CH2M Hill
Lara Daly, P.E, King
Jennifer L. Meisenhelder, King
File 4217-001-001 (105)

ATTACHMENT 1

ERP Completeness Letter
ERP Plan Sheet Index

Florida Department of Environmental Protection

Southwest District Office
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Job # _____ RECEIVED
To. LGD
JUL 09 2009
Document nas been scanned
De net route - for filing only

Charlie Crist
Governor
Jeff Kottkamp
Lt Governor
Michael W. Sole
Secretary

July 8, 2009

Ms. Susan J Metcalfe, Director
Citrus County Solid Waste Management
P.O. Box 340
Lecanto, Florida 34460

File No.: 09-0291076-002
Applicant: Citrus County Solid Waste Transfer Station and Associated Site Improvements

Dear Ms. Metcalfe:

This is to acknowledge receipt of the application on April 16, 2009, and the most recent additional information received on June 12, 2009, for an Environmental Resource Permit, pursuant to Chapter 373, and 403, Florida Statutes, to construct a surface water management system for a new solid waste transfer station and associated buildings. The project is located at 230 West Gulf to Lake Highway, Lecanto, Section 1, Township 19 South, Range 18 East, Citrus County.

This letter constitutes notice that a permit will be required for your project pursuant to Chapters 403 and 373, Florida Statutes.

Your application for a permit is complete as of June 12, 2009, and processing has begun. You are advised that the Department under Chapter 120, Florida Statutes, must take final action on your application within ninety (90) days unless the time is tolled by an administrative hearing.

This staff assessment is preliminary and is designed to assist in the review of the application prior to final agency action. The comments provided herein are not the final position of the department and may be subject to revision pursuant to additional information and further review.

If you have any questions, please contact Mr. Dennis Pierson at (813) 632-7600, extension 398. When referring to this project, please use the file number indicated above.

Sincerely,

Dennis Pierson
Engineering Specialist
Environmental Resource Management

Tom Glancy
Environmental Manager
Environmental Resource Management

cc: Lara G.B. Daly, P.E., Senior Project Manager, King Engineering Associates, Inc., 4921 Memorial Highway, Suite 300, Tampa, Florida 33634

ATTACHMENT 2

Stormwater Operations & Maintenance Manual

CITRUS COUNTY SOLID WASTE TRANSFER STATION AND ASSOCIATED SITE IMPROVEMENTS

STORMWATER OPERATIONS & MAINENANCE MANUAL

Prepared For:

CITRUS COUNTY BOCC
3600 West Sovereign Path, Suite 266
Lecanto, Florida 34461

Prepared By:

KING ENGINEERING ASSOCIATES, INC.
4921 Memorial Highway
One Memorial Center, Suite 300
Tampa, Florida 33634

King
ENGINEERING ASSOCIATES, INC

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
AUG 26 2009
SOUTHWEST DISTRICT TAMPA

June 2009
Revised: July 2009

CITRUS COUNTY SOLID WASTE TRANSFER STATION AND ASSOCIATED IMPROVEMENTS

STORMWATER OPERATIONS AND MANTENANCE MANUAL

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D. Special Procedures Regarding the Yard and Wood Waste Facility 5

Lara G B Daly, P.E.
FL 61035

July 6, 2009

I. GENERAL

To address the County's growing population and its solid waste needs, this County proposes redeveloping the north 30 acres of the existing landfill site into a Solid Waste Transfer Station and a new scale facility, CSA, yard waste processing facility and ancillary systems. The site is owned by the Citrus County Board of County Commissioners and operated by Citrus County Solid Waste Management Division. The facility will be co-located with the County's landfill at 230 W Gulf to Lake Hwy, Lecanto, Florida, 34461. It is bound to the east, west and south by Withlacoochee State Forest and to the north by State Road (SR) 44 also known as West Gulf to Lake Highway. It is located in Section 01, Township 19 South and Range 18 East. While the transfer station will be owned and operated by the County, the hauling of the waste to an out-of-County landfill will be contracted out.

The proposed improvements include the following new structures and facilities:

- Transfer Station building;
- Scale Facility;
- Citizen's Service Area (CSA);
- Household Hazardous Waste (HHW) Facility;
- Electrical Building;
- A Dry Storage Building;
- Yard and Wood Waste Area;
- A 24-hour Recycling Center;
- Utilities including fire and water main improvements, potable and fire water booster pump stations, sanitary sewers and a performance based septic system;
- A leachate pump station;
- Diesel fuel storage and dispensing system;
- Two standby generators;
- Improved drainage and an internal road and parking system.

II. STORMWATER SYSTEM OPERATION & MAINTENANCE

The operation and maintenance (O & M) of the Citrus County Transfer Station stormwater management facility shall be in accordance with 62-346.095 FAC as required by the Florida Department of Environmental Protection (DEP). The system has been designed based on acceptable engineering principles and should provide a permanent means of stormwater treatment if properly maintained.

The site stormwater system consists of a combination of overland flow, swales, ditches, inlets and storm sewer that route stormwater to ten stormwater ponds. Basins contributing to the ponds are shown on the Proposed Conditions Drainage Map within the Construction Plans, while details regarding the stormwater system design are provided in the project Drainage Report. No waste is disposed of within these ponds or any other natural or artificial body of water.

Stormwater management systems should be inspected on a routine basis to ensure that they are functioning properly. Inspections should be scheduled on a monthly or quarterly basis and following any major rain event. More frequent inspections may be necessary during the rainy season. Keeping detailed notes on maintenance activities will help when providing a report to the DEP at the time of your 18- or 24-month inspection. Your Environmental Resource Permit (ERP) will include a condition that specifies how often the inspection reports are due.

It would be wise to designate one individual as the person responsible for overseeing operation and maintenance activities, monitoring and reporting. This will allow that individual to become well acquainted with the SWMS. Provide this person with a copy of the permit and District-approved construction drawings should questions or issues develop.

For normal operation, the following O & M procedures should be performed periodically.

A. General Maintenance

1. All stormwater pipes, inlets, catch basins, manholes, flumes, pond inflow and outfall structures (including oil skimmers), and discharge pipes should be inspected on a regular basis (monthly or quarterly) and after major rainfalls. They should be maintained by removing built- up debris and vegetation and repairing deteriorating structures.
2. Chemicals, oils, greases or similar wastes are NOT to be disposed of directly to the stormwater facility or through storm sewers. Treatment ponds are designed to treat normal road, parking lot, roof and yard runoff only. Some chemicals may interfere with a treatment pond's functions or kill vegetation and wildlife. Also, do not dispose of grass clippings in a SWMS. Grass clippings pose problems by smothering desirable vegetation and clogging outfall structures.
3. Accumulated pond sediments may contain heavy metals such as lead, cadmium and mercury, as well as other potentially hazardous materials. Therefore, sediments removed from storm sewers, inlets, pipes and ponds should be disposed of at an approved facility.
4. During any repair or maintenance activity, use care to avoid causing erosion or siltation to adjacent or off-site areas.
5. Alterations (filling, enlarging, etc.) of any part of the stormwater facility is not permitted without prior approval from all applicable governing agencies.
6. The approved Operation and Maintenance Permit and as- built drawings are available at your local DEP service office. Refer to those plans and permits for additional restrictions, instructions and conditions.
7. Mosquito growth can be minimized in a SWMS by the following measures:

- Do not dump grass clippings or other organic debris into a SWMS — decaying grass clippings and other decomposing vegetation create ideal conditions for breeding mosquitoes.
- Clean out any obstructions that get into the system. Debris can obstruct flow and harbor mosquito eggs and larvae.
- Remove water lettuce and water hyacinth, which nourish and shelter mosquito larvae.
- Stock ponds with predatory "mosquito fish" – Gambusia minnows, which may be collected from other ponds and ditches and introduced into your SWMS. Remember, the introduction of grass carp into your SWMS will require District approval.

8. The facility and surface water management system should be inspected monthly for sinkhole activity. If any areas of subsidence are observed, the Department will be alerted in accordance with permit requirements.

B. Ditches & Swales

Ditches and swales should be periodically mowed and cleaned of accumulated refuse. During the mowing operations, ditches and swales should be inspected for bare spots, damage or erosion. Bare areas should be sodded or seeded to replace the grass cover. In the case of erosion, replace the missing soils and bring the area back to grade.

C. Dry Retention Ponds (a.k.a. Percolation Ponds)

1. On a monthly or quarterly basis, and following a storm event, the entity responsible for maintenance should make an inspection of the pond and its outfall structure to ensure that the system is operating properly. If standing water persists longer than 72 hours after a normal summer rain event, or if wetland vegetation such as cattails grow in the pond, the stormwater facility may be in need of repair. Repairs may be as simple as scarifying or raking the pond bottom, or may consist of removing the bottom sediment (approximately the top foot of soil) and replacing the

soil with clean sand. For more information, contact your local DEP office.

2. Mow frequently enough to prevent thatch buildup. Pick up grass clippings after cutting. Limit fertilizer use around the pond, and do not fertilize grass in the pond area.
3. Resod any areas (sides or bottom) where grass or sod has been removed or eroded in order to maintain turf/grass vegetation in the stormwater pond at all times.

D. Special Procedures Regarding the Yard and Wood Waste Facility

The yard and wood waste facility currently consists of asphalt pavement and will continue to do so once the new area is constructed. The facility was designed to be higher than its surroundings with swales or ponds along its perimeter, therefore run-on of stormwater from adjacent areas should not occur.

Stormwater on the yard waste facility sheet flows both toward the perimeter. The slopes on the pavement have been designed to avoid extended ponding of runoff and rainfall in the staging, processing, storage and screening areas.

In operating the yard waste facility, the following additional guidelines should be followed:

1. Windrows and other piles of non-processed yard and wood waste should be positioned so as to not obstruct stormwater flow to the perimeter;
2. In order to avoid introducing pathogens to the finished product, delivered yard waste and each progressive stage in processing should be positioned on the pavement such that stormwater flows in general from the finished product toward the delivery area;

ATTACHMENT 3

Proof of Publication

Proof of Publication

from the

CITRUS COUNTY CHRONICLE

Crystal River, Citrus County, Florida

PUBLISHED DAILY

STATE OF FLORIDA
COUNTY OF CITRUS
Before the undersigned authority personally appeared

Mary Ann Naczi

Of the Citrus County Chronicle, a newspaper published daily at Crystal River, in Citrus County, Florida, that the attached copy of advertisement being a public notice in the matter of the

767-0812 WCRN PUBLIC NOTICE State of Florida Department of Environmental protection Notice of Application The Department announces receipt of an application for permit from the Citrus County Solid Waste Division for a permit to construct a solid waste tr

Court, was published in said newspaper in the issues of

August 12th, 2009,

Affiant further says that the Citrus County Chronicle is a Newspaper published at Crystal River in said Citrus County, Florida, and that the said newspaper has heretofore been continuously published in Citrus County, Florida, each week and has been entered as second class mail matter at the post office in Inverness in said Citrus County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Mary Ann Naczi

The forgoing instrument was acknowledged before me

This 12th day of August 2009

By: Mary Ann Naczi

who is personally known to me and who did take an oath.

Nancy A Parke
Notary Public

NANCY A. PARKE
Comm# DD0698633
Expires 3/24/2011

767-0812 WCRN
PUBLIC NOTICE

State of Florida
Department of Environmental protection
Notice of Application

The Department announces receipt of an application for permit from the Citrus County Solid Waste Division for a permit to construct a solid waste transfer station, citizen service area, and related appurtenances subject to Department rules, referred to as the Citrus County Transfer Station, at the existing Citrus County Central Class I Landfill site, located on S.R. 44, 3 miles east of Lecanto, Citrus County, Florida.

This application is being processed and is available for public inspection during normal business hours 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the Department of Environmental Protection, Southwest District Office, 13051 North Telecom Parkway, Temple Terrace, Florida 33637-0926.

Published one (1) time in the Citrus County Chronicle Aug. 12, 2009

APPLICATION FOR PERMIT
CITRUS COUNTY TRANSFER STATION
(VOLUME I)

Dept Of Environmental Protection
AUG 26 2009
Southwest District

submitted to the

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

in

June 2009
Revised August 2009

prepared for

CITRUS COUNTY
SOLID WASTE MANAGEMENT DIVISION
230 WEST GULF-TO-LAKE HIGHWAY
LECANTO, FL 34461

prepared by

KING ENGINEERING ASSOCIATES, INC.
4921 MEMORIAL HIGHWAY
ONE MEMORIAL CENTER
TAMPA, FLORIDA 33624

King
ENGINEERING ASSOCIATES, INC

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Florida Department of Environmental Protection
Twin Towers Office Bldg , 2600 Blair Stone Road, Tallahassee, Florida 32399-2400

DEP Form # 62-701 900(4)
Form Title Application to Construct, Operate, or Modify a Waste Processing Facility
Effective Date 05-27-01
DEP Application No _____ (Filled by DEP)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

APPLICATION FOR PERMIT TO CONSTRUCT, OPERATE OR MODIFY A WASTE PROCESSING FACILITY

GENERAL REQUIREMENT: Solid Waste Management Facilities shall be permitted pursuant to Section 403.707, Florida Statutes, (F.S.) and in accordance with Florida Administrative Code (F.A.C.) Chapter 62-701. A minimum of four copies of the application shall be submitted to the Department District Office having jurisdiction over the facility. The appropriate fee in accordance with Rule 62-701.315(4), F.A.C., shall be submitted with the application by check made payable to the Department of Environmental Protection (DEP). Complete appropriate sections for the type of facility for which application is made and include all additional information, drawings, and reports necessary to evaluate the facility.

Please Type or Print in Ink

A. GENERAL INFORMATION

1. Type of facility (check all that apply):
   [X] Transfer Station
   [ ] Materials Recovery Facility:
      [ ] C&D Recycling
      [ ] Class III MRF
      [ ] MSW MRF
      [ ] Other Describe: _____
   [ ] Volume Reduction Facility
      [ ] Pulverizer / Shredder
      [ ] Compactor / Baling
      [ ] Other Describe: _____

   NOTE: C&D Disposal facilities that also recycle C&D, shall apply on DEP FORM 62-701.900(6), F.A.C.

2. Type of application:
   [X] Construction / Operation
   [ ] Operation Without Additional Construction

3. Classification of application:
   [X] New
   [ ] Renewal
   [ ] Substantial Modification
   [ ] Intermediate Modification
   [ ] Minor Modification

4. Facility name: Citrus County Solid Waste Transfer Station

5. DEP ID number: SWD/09/39859 County: Citrus

6. Facility location (main entrance): 230 West Gulf to Lake Highway, Lecanto, FL 34461

7. Location coordinates:

   Section: 01 Township: 19S Range: 18E

   UTMs: Zone 17 359.84 km E 3,192.64 km N

   Latitude: 28 ° 51 ' 13.83" Longitude: 82 ° 26 ' 12.59"

8. Applicant name (operating authority): Citrus County Solid Waste Management

Mailing address: P. O. Box 340 (Street or P.O. Box) Lecanto (City) FL (State) 34460 (Zip)

Contact person: Susan Metcalfe Telephone: (352)527-7670

Title: Solid Waste Management Director susan.metcalfe@bocc.citrus.fl.us (E-Mail address (if available))

9. Authorized agent / Consultant: King Engineering Associates, Inc.

Mailing address: 4921 Memorial Hwy, Suite 300 (Street or P.O. Box) Tampa (City) FL (State) 33634 (Zip)

Contact person: Christopher F. Kuzler, P.E. Telephone: (813)880-8881

Title: Sr. Vice President ckuzler@kingengineering.com (E-Mail address (if available))

10. Landowner (if different than applicant: Citrus County BOCC

Mailing address: 110 N. Apopka Ave (Street or P.O. Box) Inverness (City) FL (State) 34450 (Zip)

Contact person: John Thrumston, Chairman Telephone: (352)341-6560

(E-Mail address (if available))

11. Cities, towns and areas to be served: Citrus County including but not limited to towns of Inverness, Lecanto and Crystal River

12. Date site will be ready to be inspected for completion: _____

13. Estimated costs:

Total Construction: $_____ Closing Costs: $ N/A

14. Anticipated construction starting and completion dates:

From: _____ To: _____

15. Expected volume of waste to be received: _____ yds^3/day 850 tons/day increasing ±5%/year

16. Provide a brief description of the operations planned for this facility:

Refuse trucks from County limits will unload solid waste onto the tipping/storage floor. The waste is then pushed into the open pit where a transfer vehicle is positioned below. The solid waste is compacted into transfer trailers and then taken to an approved FDEP landfill location to be determined. A Community Service Area, a Household Hazardous Waste and Yard Waste Centers will be operating within the facility.

B. ADDITIONAL INFORMATION

Please attach the following reports or documentation as required.

1. Provide a description of the solid waste that is proposed to be collected, stored, processed or disposed of by the facility, a projection of those waste types and quantities expected in future years, and the assumptions used to make the projections (Rule 62-701.710(2) (a), F.A.C.).

2. Attach a site plan, signed and sealed by a professional engineer registered under Chapter 471, F.S., with a scale not greater than 200 feet to the inch, which shows the facility location, total acreage of the site, and any other relevant features such as water bodies or wetlands on or within 200 feet of the site, potable water wells on or within 500 feet of the site and wells serving community water supplies on or within 1000 feet of the site (Rule 62-701.710(2) (b), F.A.C.).

3. Provide a description of the operation and functions of all processing equipment that will be used with design criteria and expected performance. The description shall show the flow of solid waste and associated operations in detail, and shall include (Rule 62-701.710(2) (c), F.A.C.):
   a. Regular facility operations as they are expected to occur;
   b. Procedures for start up operations, and scheduled and unscheduled shut down operations; and
   c. Potential safety hazards and control methods, including fire detection and control.

4. Provide a description of the design requirements for the facility which demonstrate how the applicant will comply with Rule 62-701.710(3), F.A.C.

5. Provide a description of the loading, unloading, storage and processing areas (Rule 62-701.710(2) (d), F.A.C.).

6. Provide the identification and capacity of any on-site storage areas for recyclable materials, non-processable wastes, unauthorized wastes, and residues (Rule 62-701.710(2) (e), F.A.C.).

7. Provide a plan for disposal of unmarketable recyclable materials and residue, and for waste handling capability in the event of breakdowns in the operations or equipment (Rule 62-701.710(2) (f), F.A.C.).

8. Provide a boundary survey, legal description, and topographic survey of the property (Rule 62-701.710(2) (g), F.A.C.).

9. Provide an operation plan which describes how the applicant will comply with Rule 62-701.710(4), F.A.C. (Rule 62-701.710(2) (h), F.A.C.).

10. Provide a closure plan which describes generally how the applicant will comply with Rule 62-701.710(6), F.A.C. (Rule 62-701.710(2) (I). F.A.C.).

11. Unless exempted by Rule 62-701.710(10(a), F.A.C., provide the financial assurance documentation required by Rule 62-701.710(7), F.A.C. (Rule 62-701.710(2) (j), F.A.C.).

12. Provide documentation to show that stormwater will be controlled according to the requirements of Rule 62-701.710(8), F.A.C.

13. Provide documentation to show that the applicant will comply with the recordkeeping requirements of Rule 62-701.710(9), F.A.C.

C. CERTIFICATION BY APPLICANT AND ENGINEER OR PUBLIC OFFICER

1. Applicant:

The undersigned applicant or authorized representative of Citrus County Board of County Commissioners is aware that statements made in this form and attached information are an application for a New Transfer Station. Permit from the Florida Department of Environmental Protection and certifies that the information in this application is true, correct and complete to the best of his/her knowledge and belief. Further, the undersigned agrees to comply with the provisions of Chapter 403, Florida Statues, and all rules and regulations of the Department. It is understood that the Permit is not transfe rable, and the Department will be notified prior to the sale or legal transfer of the permitted facility.

Susan J Metcalfe
Signature of Applicant or Agent

P. O. Box 340
Mailing Address

Susan J. Metcalfe, Director
Name and Title (Please type)

Lecanto, FL 34460
City, State, Zip Code

Susan.metcalfe@bocc.citrus.fl.us
E-Mail address (if available)

(352) 527-7670
Telephone Number

Attach letter of authorization if agent is not a governmental official, owner, or corporate office r.

2. Professional Engineer registered in Florida (or Public Officer if authorized under Sections 403.707 and 403.7075, Florida Statues):

This is to certify that the engineering features of this waste processing facility have been designed / examined by me and found to conform to engineering principles applicable to such facilities. In my professional judgment, this facility, when properly maintained and operated, will comply with all applicable statutes of the State of Florida and rules of the Department. It is agreed that the undersigned will provide the applicant with a set of instructions of proper maintenance and operation of the facility.

Signature

4921 Memorial Hwy, Suite 300
Mailing Address

Christopher F. Kuzler, P.E.
Name and Title (please type)

Tampa, FL 33634
City, State, Zip Code

45532
Florida Registration Number
(please affix seal)

(813) 881-8880
Telephone Number

Date:

PART B – ADDITIONAL INFORMATION

Introduction

This Application is being submitted to the Florida Department of Environmental Protection (FDEP) pursuant to 62-701.710, F.A.C for the construction of a transfer station to be owned by the Citrus County Board of County Commissioners and operated by Citrus County Solid Waste Management Division. The facility will be co-located with the County's landfill at 230 W Gulf to Lake Hwy, Lecanto, Florida, 34461. It is bound to the east, west and south by Withlacoochee State Forest and to the north by State Road (SR) 44 also known as West Gulf to Lake Highway. It is located in Section 01, Township 19 South and Range 18 East.

~~The current facility accepts municipal solid waste, recyclables, yard waste and household hazardous waste.~~ The site consists of a total of 80 acres of land with an active landfill on the south 50 acres and an administration and citizens service area (CSA) on the north 30 acres. Adjacent to the project's western border there is a closed 60-acre landfill. Presently, Citrus County citizens without commercial trash service deliver their trash to the CSA while the landfill is used by commercial and private hauling services that have agreements with individuals, neighborhoods and businesses. The current facility accepts municipal solid waste, recyclables, yard waste, waste tires and household hazardous waste.

To address the County's growing population and its solid waste needs, this project includes redeveloping the north 30 acres of the site to include a new scale facility, CSA, yard waste processing facility and ancillary systems. The County has also elected to pursue decreasing the amount of waste that is buried in the active landfill in order to increase its life. As part of attaining this goal, and in order to reduce the amount of waste buried within Citrus County, the project also includes the construction of a transfer station. The transfer station will be used in combination with the on-site landfill for trash disposal. The transfer

station will be owned and operated by the County; however, the hauling of the waste to an out-of-County landfill will be contracted out.

The proposed improvements include the following new structures and facilities:

- Transfer Station building;
- Scale Facility;
- Citizen's Service Area (CSA), including the relocated waste tire facility;
- Household Hazardous Waste (HHW) Facility;
- Electrical Building;
- A Dry Storage Building;
- Yard and Wood Waste Area;
- A 24-hour Recycling Center;
- Utilities including fire and water main improvements, potable and fire water booster pump stations, sanitary sewers and a performance based septic system;
- A leachate pump station;
- Diesel fuel storage and dispensing system;
- Two standby generators and electrical improvements; and,
- Improved drainage and an internal road and parking system.

As part of constructing the above, the existing administration building, maintenance building, leachate treatment facility, electronics recycling building, and HHW structure will remain. The existing CSA walls and scale facility will be demolished, with the existing paved CSA area converted to a yard waste processing area.

The transfer station building will be a 17,497 square foot pre-engineered metal building. The single slot transfer station has been designed to process a peak daily waste load of 850 tons (maximum load handled over a 24 hr period) using top load technology and has been designed to allow the addition of a second and third loading slot if necessary. The building will be equipped with a continuous

ventilation system via direct drive supply and exhaust fans as well as a fire sprinkler system. The scale house facility will consist of a ±1,580 square foot scale house with a service station type canopy. It will have two in-bound and two out-bound scales. The inside out-bound scale will serve as a reversible unit capable of being converted to a temporary in-bound scale. Each scale is proposed to~~will~~ be 70 feet long and 11 feet wide with a capacity of 100 tons but can be a minimum of 60 feet long and 10 feet wide.~~.~~

The CSA will consist of the following:

- 8 multi-purpose roll-off bins with 7 slots for future expansion;
- Areas for tires, high pressure tanks, Freon/white goods and scrap metals and electronics~~;~~
- The HHW Facility.

The HHW Facility will have an area for packing, processing, sorting and storage, ~~area for electrical appliances,~~ paint, battery, a hazardous material identification laboratory, an equipment and emergency spill room, used motor oil storage and used anti-freeze area, MCD collection area, ~~-~~toilet and shower room for both men and women and a manager's office.

The dry storage building will be used for paper goods, files and non-hazardous, routine delivery storage in support of the existing administration building.

Construction Phasing

Construction of the proposed facilities and demolition of existing facilities will take place in two phases. The intent of construction phasing is to allow the facility to remain in operation throughout construction. In general, all of the new facilities, except for the yard waste processing area, will be constructed during Phase 1 Operations will then transfer over to the new facilities after clearance is obtained from the FDEP. In Phase 2, the existing scale facility will be demolished and the paved area formerly occupied by the CSA will be converted to the new yard

waste processing area. Specifically, each phase is expected to include the following work:

Phase 1

- Construction of the new transfer station building, scale facility, CSA, HHW Facility, electrical building, dry storage building, 24-hour recycling center,
- Utilities including fire and water main improvements, potable and fire water booster pump stations, sanitary sewers and a performance based septic system;
- Leachate pump station and associated force main;
- Diesel fuel storage and dispensing system;
- Standby generator and electrical improvements;
- Roads and stormwater improvements within the Phase 1 construction area.

Because the Phase 1 construction area encroaches on the southern portion of the existing CSA currently used for metals collection, the scrap metals collection area will be relocated as shown on the Site Phasing Plan (sheet C1.04). In addition, construction of transfer station will encroach upon the area currently used for yard waste processing. During Phase 1, a temporary yard waste processing area will be constructed on the west side of the active landfill top of bank as shown on the Site Phasing Plan (sheet C1.04).

Phase 2

- Demolition of the existing scale facility;
- Demolition of the existing CSA walls, asphalt overlay/expansion and conversion of the CSA area to the new yard waste processing area;
- Completion of road and stormwater system improvements.

At the completion of Phase 2, the temporary yard waste processing area will be taken out of service.

Construction of the new facilities and demolition of the existing facilties is not expected to impact operations at the active landfill, closed landfills and the existing landfill stormwater and leachate pumping and treatment systems.

1. SOLID WASTE DESCRIPTION [62-701.710(2)(a) FAC]

Solid Waste to be Collected, Stored, Processed, or Disposed of by the Facility

The solid waste collection boundary for Citrus County, illustrated in Attachment A, includes all of Citrus County limits and the municipalities of Crystal River and Inverness, Florida. Presently, Citrus County citizens without collection service deliver their trash to the CSA while the landfill is used by commercial and private hauling services that have agreements with individuals, neighborhoods and businesses. Primarily, municipal solid waste is accepted at the current facility. Household Hazardous waste is also accepted. Approximately 116,274 tons (382 tons per day) of waste was handled in the facility in the year 2008. Below is a breakdown of the tonnage per type of waste:

FY 2008	Tons
Tires	301 43
Yardwaste	12,480 06
Metal	64 15
MCD	3 73
Recycle/Electronics	326 64
HHW/CESQG	1,118 39
Special/Tanks	1,662 63
MSW	100,316 57
Other	0 00
Emergency	0 00
Total	116,273 61

Grass clippings, tree trimmings, and other yard wastes are directed to the Yard Waste Processing Area.

Projection of Solid Waste Types, Projection of Quantities Expected in the Future and Assumptions for Projections

The proposed Citrus County Solid Waste Transfer Station will accept municipal solid waste from commercial and self-haulers. Rolloff containers from the CSA will also be unloaded in the transfer station.

The projection of quantities expected in the future is based on growth rates taken from the University of Florida Bureau of Economic and Business Research (BEBR) and based on a range of projections that included low, medium and high estimates in 5 year increments. A chart of the projections developed during the project's preliminary engineering phase is included in Attachment B. Daily averages for each month were calculated based on a 6 day work week for FY 2005 and FY 2006 for the Landfill, CSA and Total tonnage. The average daily tonnage for 2006 was used as the basis of the low, medium and high projections. A peaking factor to ascertain the peak day MSW generation for the future was established by taking the 6 highest cash days and 6 highest invoice days for FY 2006 and analyzing the product codes that contribute to the landfill or the CSA. Based on these projections, the proposed transfer station has been designed as an 850 peak ton per day facility.

2. SITE PLAN [62-701.710(2)(b) FAC]

A site location map is provided in Attachment C. A Site Plan of the proposed transfer station showing structures, buildings, fences, gates, entrances, exits, parking areas and on-site roadways is also included in Attachment C.

In general, existing structures on the site consist of an administration building, a maintenance building, a leachate pump station, storage sheds, scale platform and concrete pads for furniture and large items, recycling bins, oil recycle

collection tank, appliances and scrap metals, antifreeze and battery and fluorescent bulbs.

The proposed structures are as described previously in the Introduction.

The site of the proposed transfer station is zoned as Industrial, with the exception of the main entrance road which is zoned Commercial. The Site Plan in Attachment C also shows adjacent properties. According to FDEP's Water Central Database, there are no water supply wells 1000 feet of the property and no potable water wells within 500 feet of the transfer station property line and there are no wells serving community water supplies within 1000 feet of the transfer station property line. A well location map is shown in Attachment C.

The site does not contain any natural wetlands or open water bodies and is not located within 200 feet of any natural or artificial water body.

3. OPERATION AND FUNCTION OF PROCESSING EQUIPMENT [62-701.710(2)(c) FAC]

Existing Equipment

The County presently has equipment on site for management of their~~,~~ CSA and Yard Waste facilities. Equipment includes:

- Pickup trucks (2) for general maintenance and transport
- Utility vehicles (2) for transport
- Dump trucks (2)
- (2) ~~Water truck~~ Front end loader with large 4-way bucket, broom, grapple and fork attachments~~ for management of CSA materials~~
- Forklift
- Tractor with small bucket
- Rolloff truck for transporting roll-offs at the CSA to the landfill
- 20-yard and 30-yard rolloff boxes (10) for use at the CSA
- Bulldozer, Caterpillar D6
- Compactor, Caterpillar 826 G
- Compactor, Caterpillar 826 H
- Self-Loading Scraper (Pan), Caterpillar 623F, 23 Yard
- Fuel Truck, Ford F350 – with 400 gallon diesel fuel tank and air compressor

- Water Truck, Ford 700, w/2000 gallon water tank & 100 g.p.m. pump (18 H.P. B&S)
- (2) Lite Sets, Alamand, with 6kw generator
- Dump Trailer, 6' x 12', Hydraulic
- Grabber Attachment for 55 Gal. Drums, for the Fork Lift
- Generator, 150 kW Caterpillar (Olympian), Trailer mounted,
- Water Transfer Pump, 4" outlet, Mack, Hydraulic drive
- Water Transfer Pump, 4" outlet, Acme
- Hand Tools and Mechanics Tools, at both the Maintenance Building and HHW.
- Various mowers and lawn maintenance equipment

Proposed Equipment

The new scale facility will include a scale house and two inbound scales and two out bound scales. Each aboveground, flat top scale will be a minimum of 6070-feet long with a capacity of 200,000 lbs. The new transfer station will be operated using open top type technology utilizing a knuckleboom crane positioned over the loading pit that will be operated from a control booth over the slot. The crane will be used to level and compact material that is loaded into the open top transfer trailers. Citrus County will contract the hauling of the municipal waste from the transfer station to the landfill. The number of transfer trucks needed will depend on factors such as pay-load and trip distance and will be the responsibility of the contractor. The County will obtain additional buckets for its front-end loaders as required to work in the transfer station, landfill or CSA. Other equipment the County plans on procuring includes a skid steer with broom and blade attachments and ~~,~~ a yard truck which may be owned or leased depending on contract ~~and if composting yard waste, a scarab or similar may be purchased~~. Equipment for screening and mulching will be contracted.

3a. Regular Facility Operations [62-701.710(2)(c)(1) FAC]

The operating hours of the existing CSA and landfill are 8:00 a.m. to 4:30 p.m., Monday through Friday and 8:00 a.m. to 2:30 p.m. on Saturdays. The operating hours are posted at the entrances to the facility. The proposed Transfer Station will be operated during the same hours until the

average amount of municipal waste processed each day is such that it warrants longer hours. The proposed recycling center will be open 24 hours per day. The HHW will be open for customer deliveries when staffing levels will support the safe handling of~~same hours as~~ the material delivered.~~CSA on weekdays and on one Saturday each quarter.~~ Citrus County staff will have unlimited access to the HHW facility to deposit materials found during normal operations.

All vehicles destined for the landfill, transfer station, CSA, HHW or the yard waste facility enter the site via SR 44. All customers must head east and pass through the scale facility as they enter and exit the site. Customers are weighed and charged in accordance with the current fee schedules (Attachment A). From the scale facility, commercial haulers are directed to either the transfer station or the landfill. Residential customers are directed to the CSA, HHW or yard waste area. Depending on their load, residential customers and small scale commercial haulers may also be directed to the self-haul unloading area at the transfer station.

Transfer trailers will enter the site from the main entrance at SR 44 and head south along the western boundary of the site and then east to the transfer building. In the tunnel, the open-top trailers will be loaded from above and a knuckleboom crane will compress and groom the load. A scale~~s~~ will be located in the tunnel~~s~~ to monitor the load in the trailers The weight of the load will be displayed on a screen located on the tipping floor as well as in an area visible to the trailer driver. After being loaded, the trailers will exit the transfer building and head west to the western boundary of the property and then north where they will exit the site either through the main entrance or through the secondary entrance at the 24-hour recycling center.

The Recycle Center customers will enter the site from a separate entrance on SR-44, drop off the material at one of the six recycling bins and exit the

facility in a counter-clockwise manner. Customers exiting the scale facility also have the option of turning north to visit the Recycling Center and then exiting the site from the secondary entrance.

Currently, no sorting of municipal waste occurs at this facility, or is proposed in the future transfer station building, other than that required to remove prohibited items discovered in the waste.

At the end of the day, staff will ensure the following procedures are completed:

- All truck doors on the transfer station tipping floor level will be closed and secured, this will also include the overhead door in self-haul drop off area on the East side of the tipping floor.
- Sweeping up and litter control around the scalehouse, transfer station and CSA;
- Cleaning out of leachate grates.
- A complete walk around of all equipment will be done and damage or issues that might have accrued will be noted on the operator's inspection sheet for that machine.
- The tunnel area will have the truck doors closed and secured. The tunnel area will be inspected for any damage or issues that might impact the operation of the transfer station.
- A check of the transfer station will be done to make sure that no unauthorized persons are present. All lights will be turned off in the tipping floor and tunnel area.
- The restroom area will be inspected for any damage or issues that might have accrued during the day. The restroom will then have its lights turned off and it will be secured.

No waste should be accepted in the transfer station while it is closed.

3b. Procedure for Scheduled and Unscheduled Shutdowns [62-701.710(2)(c)(2) FAC]

Scheduled shutdowns of the transfer station will be treated as an end of the business day event described above. If the scheduled shutdown is to last into the next business week or there are issues that could impact the timely shipment of waste, then the tipping floor will be cleared of all material. In the event of an unscheduled shutdown of the transfer station, the doors to the tipping floor will be closed and the scale house will notified to divert trucks delivering waste to the Landfill area. If the Solid Waste Management Division Director did not initiate the shutdown, the transfer station spotter will notify he or she or their designee of the issue causing the shutdown. If the shutdown impacts the tunnel area those doors shall also be shut. In the event the shutdown was due to an emergency, the FDEP will be notified within 24 hours. Other contingency policies in place at the facility are outlined below. As needed other resources will be called to assist with re-opening the transfer station.

3c. Potential Safety Hazards and Control Methods including fire detection and control [62-701.710(2)(c)(3) FAC]

The following information is in accordance with 62-701.710 (2)(c)(3) and is utilized as a contingency plan for the transfer station to cover operation interruptions and emergencies such as fires, explosions and natural disasters in accordance with 62-701.320(7)(e)(2).

Possible safety hazards for the transfer station include but may not be limited to traffic type hazards, slip and fall type hazards, fire hazard, and any other type hazard found in an industrial setting. Should some type of incident happen, the transfer station spotters will be able to notify supervision and 911, if needed, by using their county supplied radio.

General Public Safety

In order to limit possible traffic type hazards, speed and informational type signs are located throughout the site. Users of the transfer station will be instructed on basic operation in how to get to, use, and leave the site. As needed, the transfer station spotters will give any special instructions to drivers using the transfer station. The transfer station spotters will keep alert for any possible hazards that could lead to a slip and/or fall incident. When such a hazard is discovered it will be removed or the area will be coned off to restrict foot and vehicle traffic in it.

Security

The current site is enclosed by a 6-foot chain link fence, which will remain during and after construction. Gates allowing entrance to the site are locked at the end of each business day. The station will be properly staffed with County personnel during operating hours.

Response Procedures to Liquid Spills or Leaks

In the event of an uncontrolled leak or spill, the personnel discovering the leak or spill should take the following actions, only if it is safe to do so:

- Notify the Administrative Office, via radio / cell phone, who will advise the Emergency Response Coordinator.
- Ensure safety of personnel in area, as necessary
- Eliminate sources of ignition

~~Should an unknown liquid or material other than leachate be found leaking or spilled in the transfer station the spotters will, if possible, perform the following steps,~~

- Stop flow at~~Identify~~ the source ~~of the material~~
- Contain~~Identify~~ the leak or spill

The Emergency Response Coordinator shall direct facility staff in response procedures as the situation dictates. Actions may include, but not limited to:

- Evacuate area, if necessary
- Confirm identification of spilled material and check the Material Safety Data Sheets (MSDS) emergency procedures
- Confirm that additional personnel have been assigned to stop the flow of spilling product and secure leaks, if it can be done safely
- Assess the spill threat, site safety, and parameters such as spill volume, extent and direction of movement
- Follow up containment efforts
- Establish a Hot Zone and Safe Work Area
- Initiate clean up actions, if it can be done safely
- Initiate actions to notify local authorities, emergency response agency, and government agencies, as necessary
- Follow Cleanup / Decontamination procedures outlined in Item L. of the Transfer Station Emergency Incidents Plan
- ~~If coming from a customer's vehicle, the spotter will notify the driver of the issue.~~
- ~~Cone off the area, evacuate customers and co-workers, and move any equipment that might be effected by the material or be in the area to be secured.~~
- ~~If possible put down absorbent to mitigate the issue.~~
- ~~Contact supervision to notify them of the problem.~~
- ~~Should the type of material or the amount spilled be great than that which can be safely and effectively handled by staff, the supervisor can notify the Citrus County Department of Fire Rescue to assist in handling of the event.~~

- ~~After the incident is evaluated then a contractor will be contacted to remediate the issue.~~

~~If the material discovered is identified to be hazardous or causing adverse health effects the transfer station will be evacuated immediately and 911 will be notified.~~

Flood Planning and Response

According to FIRM Flood Insurance Map 1200630250B under attachment D, the site is located in Zone C, areas of minimal flooding. The 100-year flood elevation for these areas are not determined by FEMA. As part of the improvements, all buildings will be constructed above the 100-year storm elevation determined for the outfall ponds. The existing containers at the CSA and all transfer trailers containing solid waste would be moved to the tipping floor or removed from the transfer station site in advance of the storm, given proper notice.

Poor Weather Conditions and Natural Disasters

Unusual operating conditions could result from excessive rainfall and electrical storms. The type and volume of materials to be disposed of after a hurricane or excessive storms will change normal transfer station operations. During extremely high wind conditions or electrical storms, operations will be temporarily suspended to protect the workers and the public. Disposal operations will be suspended immediately before and during a hurricane or tornado.

Access to all areas of the site, including the top slope of the landfill, is provided by paved roads, all of which drain into the site stormwater system. These roads should remain accessible during typical rainy weather.

Fire Protection

The site will have dual potable water systems consisting of a domestic water system and a fire system. The fire system will consist of a series of 8-inch water mains with fire hydrants placed no further than 400-feet from any building. In addition, the new transfer station building and the office area of the HHW will be constructed with automatic fire sprinkler systems A fire and potable water booster pump station will be constructed to provide pressure to meet fire flow requirements. The processing area of the HHW will be equipped with an automatic foam fire protection system.

Fire extinguishers will be present in each building and will be mounted in the cab of all heavy machinery, control rooms, and electrical rooms. Citrus County's operating procedures require that the staff immediately contact 911 if a fire is observed. The most recent Fire Safety Review Sheet from the Citrus County Fire Marshall is presented in Attachment E. The Fire Marshall annually inspects the existing facility. The last inspection was performed in April 2009.

In accordance with County Development Review procedures, the local Fire Marshall's office will review the proposed fire system design prior to construction. Prior to operation of the facility, they will also conduct an onsite inspection of the system for compliance with required fire codes. The Fire Marshall's approval of the constructed system is one of the requirements for issuing a Building Department Certificate of Occupancy for the new building.

The transfer station spotters will be consistently alert for possible fires either from a load that is delivered or from a malfunction in the transfer station system. A first aid kit is available in the Administration Building, in heavy equipment cabs and in the HHW.

Emergency Response to Fire

If a fire is discovered by one of the transfer station spotters, they will first use their portable radio to contact supervision and inform them of the issue. Then the operator will evacuate any customers or staff that are in the effected area and, if possible move any equipment that could be damaged.

On-site personnel are aware of the location of all fire extinguishers, fire hoses, and emergency equipment. Then, and only if trained and if they elect to, they may attempt to extinguish the flame with the fire suppression equipment at hand until the fire department arrives. If the operator is not trained and/or the fire is too large the building fire suppression system will be activated and the fire department will be automatically notified. The scale house operator will also close the facility to the public and vehicles will be asked to abandon the facility. If the fire occurs when the station is unoccupied, the building's fire suppression system will automatically be activated and an alarm will be sent to the fire department.

Hot waste loads arriving at the facility will not be allowed to dispose of waste in the transfer station building. The scalehouse attendant or tipping floor spotter will request the driver to route the load to the active landfill area and follow the procedures implemented for the active landfill outlined in Section H., 1.~~2.3.4~~ of the Transfer Station Emergency Incidents~~Landfill Operations~~ Plan ~~on record with the Department~~.

Emergency Response Equipment

The emergency response equipment readily available on-site include:

Tools and small equipment:

Shovels	Poly, 65 Gal. Overpack Drum
Brooms	Poly, 30 Gal. Overpack Drum
Squeegee	Metal, 55 Gal. Drums
ABC	

Fire extinguishers Poly, 55 Gal. Drums ~~and hoses; Each vehicle onsite has a small portable fire extinguisher;~~
Bung Wrench Poly, 5 Gal. Pails
Hand Tools & Wrenches Duct Tape
First Aid Kit Scrub Bushes
Poly Sheeting Drum Placard Labeling Materials
pH Testing Tape Drum Wrenches
H_2O Testing Tape
PVC Hand Drum Pump (water & corrosives)
Rotary Drum Pump (ignitable solvent pump)
Emergency Eye Wash & Shower Station

MSA Passport Gas Meter measures

Lower Explosive Limits	(LEL)	ignitables
Carbon Monoxide	(CO)	combustion
Oxygen	(O_2)	low or super
Hydrogen Sulfide	(H_2S)	corrosion

Materials:

Mercury Absorbent Absorbent Pads ~~materials;~~
Vermiculite, Bagged Absorbent Absorbent Socks
Abzorbit, Bagged Absorbent Sodium Bicarbonate neutralizer

Personal Protection Equipment (PPE)

Chemical Resistant Aprons Personal Respirator
Chemical Resistant Coveralls Face Shields
Chemical Resistant Shoe Covers Both Neoprene and Nitrile Gloves
Chemical Resistant Smocks Leather Work Gloves
Hardhats Clear & Sunglass Safety glasses

- ~~Personal protection equipment;~~
- ~~First aid kits;~~
- ~~Soil is available for delivery by dump truck or loader, and spread with a dozer, to smother outdoor fires; and,~~
- ~~There is a water truck with a pump.~~

The transfer station project will provide a booster pump for fire flow to hydrants onsite and to the sprinkler system located in the transfer station. The HHW area will have a chemical extinguishing system. The closest fire station is 2 miles east at the intersection of SR 44 and Kensington.

Evacuation Plan

In the event of a required evacuation of the facility, an announcement will be made over radio systems and the employees will immediately evacuate through the nearest unobstructed exit. Specific procedures for evacuating the site are provided in Section I. of the Transfer Station Emergency Incidents Plan.

Unauthorized or Hazardous Material

If prohibited wastes are discovered by the scalehouse attendant or one of the facility spotters, the vehicle will be directed back to the administration office If the waste has not yet been unloaded, the person responsible for shipping the waste will be notified and the vehicle driver will be directed to leave the site. If the waste has been deposited, the area of the waste load will be blocked from public access until the generator or hauler of the waste cleans up the waste. If the generator or hauler of the waste cannot be identified or is unable to remove the waste, Citrus County will be responsible for cleanup, transportation, and disposal of the waste at an appropriate waste management facility. In all cases, the FDEP will be notified.

Items in the transfer station that are identified to be unauthorized will be given back to the driver that delivered them. If the driver does not accept the material the transfer station spotter will note the truck information and fill out a load inspection sheet for the unauthorized material. The County will also notify the FDEP of the driver's refusal to accept the unauthorized material. The material left in the transfer station will then be moved to a temporary holding area away from material being processed. The location of the holding area will be designated on a daily basis depending on the day's operations and will be cleared out daily of material staged there. If the material discovered is not authorized to be handled at the Citrus County Central Landfill then appropriate arrangements will be made to

properly handle the material. If material discovered in the transfer station is hazardous, the transfer station spotters will use their portable radio to contact supervision and inform them of the issue. Once notified, supervision or the transfer station operator on duty will take appropriate actions to mitigate the issue. The steps may include but are limited to, evacuating the transfer station, calling 911, or other appropriate actions.

Emergency Coordinators

During normal working hours, personnel are on-site at all times. In the event of an emergency, these individuals have access to (in person and/or via telephone) to the facility's emergency coordinators who are responsible for activities during an emergency situation.

Additionally, the Florida Department of Environmental Protection-Solid Waste Staff shall be notified. Their address and phone number is provided below

Florida Department of Environmental Protection
Solid Waste Staff
Southwest District
13051 N. Telecom Parkway
Temple Terrace, Florida 33637-0926
(813) 632-7600

Responsibilities of the Emergency Coordinators

At least one of the emergency coordinators is available by phone or radio at all times. Upon notification or discovery of an emergency condition, the coordinator will evaluate the situation and notify the appropriate agencies to minimize the incident. After the emergency condition has been controlled, the coordinators are responsible for investigating the incident to assess the damages, determining the cause of the incident and taking steps to prevent a reoccurrence of the incident. Coordinators are required

to file a follow-up report with the appropriate agencies as required by policy, permit, and/or law.

Clean-up operations are to commence as soon as possible to reduce the employee exposure and to properly dispose of all waste in an expedient manner. After the cleanup is complete, the coordinator must notify the appropriate state agencies prior to resuming operations.

The primary individuals responsible for the coordination and evaluation of an emergency situation are listed below. Contact attempts should be made in the order listed below:

Contact	Title	Office Phone	Mobile Phone
Susan Metcalfe	SWM Director	(352) 527-7671	(352) 400-0699
Carmen Bruno	Customer Service Supervisor	(352) 527-7670	(352) 400-0674
Prime DeVaughn	Field Crew Leader	(352) 527-7670	(352) 400-1646
E. Paul Davis	Household Hazardous Waste Coordinator	(352) 527-7670	

Agencies to be Notified

In the event of an emergency such as fire, large spills, sudden release of contaminated materials, or explosion, the following shall be notified immediately, if applicable:

Hospital: Citrus Memorial Hospital (352) 726-1551
502 West Highland Boulevard
Inverness, Florida 34453

Law Enforcement: ~~IMMEDIATE EMERGENCY 9-1-1~~

Citrus County Sheriff's Office (352) 726-4488
1 South Park Avenue
Inverness, Florida 34453

Emergency: Emergency Response - 911 911

3425 West Southern Street
Lecanto, Florida 34461

Fire and Hazardous: ~~Rescue (352) 527-5406~~

~~Citrus County Sheriffs Department (352) 726-4488~~

~~Electric (Progress Energy) (800) 452-2777~~

~~Water (~~Citrus County ~~Utilities~~ Department of Public Safety ~~)~~ (352) 527-~~5406~~7650

3600 W. Sovereign Path, Suite 291
Lecanto, Fl. 34461

Emergency Medical: Nature Coast EMS (352) 637-4121
3380 E. Gulf to Lake Highway
Lecanto, Fl 34461

Environmental: Department of Agriculture and
Consumer Services (352) 796-5650
Division of Forestry
15019 Broad Street
Brooksville, Florida 33512

Department of Environmental Protection
Division of Waste Management (813) 632-7600
13051 N. Telecom Parkway
Temple Terrace, Florida 33637

~~Protection (FDEP)~~

4. DESIGN REQUIREMENTS [62-701.710(3) FAC]

62-701.710(3)(a):
"*Tipping, processing, sorting, storage and compaction areas that are in an enclosed building or covered area shall have ventilation systems. The areas that are not enclosed shall be equipped with litter control devices and visual screenings.* "

The transfer station building will be a 17,497 square foot pre-engineered metal building. The single slot transfer station has been designed to process a peak daily waste load of 850 tons (maximum load handled over a 24 hr period) using

top load technology and has been designed to allow the addition of a second and third loading slot if necessary. Waste will be typically stored to a maximum height of 15 feet on the 13,100 square foot tipping floor.

The single slot tipping floor will have the capacity to store a surge pile of roughly 2,475 cubic yards of waste, which translates roughly to 620 tons. A depiction of this maximum storage pile is provided in Attachment F. The building will also be equipped with a forced air ventilation system. The tipping floor will have eight wall-mounted and four roof mounted exhaust fans. The tipping floor tunnel will have four propeller fan wall-mounted and three outside air intake louvers. The total fan horsepower for the transfer station is approximately 86 HP supplying a normal ventilation of 22 ACH (air exchanges per hour) with a maximum of 35 ACH.

Personnel are assigned to the transfer station to facilitate litter control during normal operating hours. The tunnel will be cleaned of all litter periodically during the course of operations and at the end of each business day. Currently, the County intends on contracting out the hauling operations. It is the intent that this contract requires that all trailers be removed ~~Remaining waste~~ from the site upon being loaded. If absolutely necessary, waste ~~transfer station~~ not stored on the tipping floor or transported off-site will be stored in transfer trailers either covered with a tarp or parked in the transfer station, within an area served by the leachate collection system, until the next business day.

62-701.710(3)(b):
"The facility shall be designed with a leachate control system to prevent discharge of leachate and mixing of leachate with stormwater, and to minimize the presence of standing water."

The facility will be constructed with a leachate collection system to collect leachate on the tipping floor and the tunnels and convey the leachate to the proposed leachate pump station which will then pump it to the existing landfill leachate pump station. Roofing over the tipping floor and tunnel, along with

grading of roadway surfaces outside the transfer station eliminate the mixing of leachate with storm water. Leachate generated within the transfer station flows into the leachate collection system trench drain on the tipping floor and floor drains in the tunnels. For ease in cleaning, the trench drain will be equipped with removable grates wide enough to accommodate a shovel.

An HDPE gravity collection system will convey the leachate from the trench drains to the proposed leachate pump station. A 4-inch leachate force main will convey leachate from the proposed pump station to the existing pump station.

The existing pump station will pump the leachate to the leachate holding tanks at the southwest corner of the landfill and ultimately the leachate will be conveyed to the leachate treatment plant. This plant receives leachate produced in the closed 7-acre landfill to the west of the site as well as the active landfill to the south of the proposed site. The leachate treatment facility separates leachate into liquid and solid constituents and sends the filtered effluent to one of the two percolation ponds directly to the south of the facility on the active landfill site. Solids are turned into sludge and sent to a sludge drying bed. If the leachate cannot be treated at the leachate plant, it is transported to one of the County's wastewater treatment plants.

The existing leachate treatment system is permitted to treat up to 30,000 gallons per day of raw leachate. Presently the 7-acre closed landfill and the active landfill cells produce an average daily leachate generation of less than 12,000 GPD, providing more than 50% of capacity for future uses. Based on similar facilities, the new Transfer Station is anticipated to produce 167 GPD of leachate on average plus approximately 5,000 gallons per week during the tipping floor washdown.

Leachate from the existing pump station is monitored, sampled and analyzed according to rule 62-701.500 (8), FAC. ~~Procedures are described in Section 7 of the Landfill Operations Plan on record with the Department.~~

62-701.710(3)(c):
"Provisions shall be made for evaluating the quantity of all incoming solid waste and recovered materials. Storage areas shall be designed to hold the expected volume of materials until they are transferred for disposal or recycle. "

As described above, incoming solid waste trucks will be weighed at the scale house to determine the weight of the solid waste delivered. Monthly summaries of this data will continue to be maintained on-site in the administration building. Upon request, these reports will be provided to the FDEP. The tipping floor will have the capacity to store approximately 620 tons of solid waste. This translates to 0.73 days of projected peak day storage in the year 2030 and 1.08 days of projected average day storage in the year 2030. If necessary, the landfill will be available to receive waste, therefore storage on the tipping floor may not be necessary.

5. LOADING, UNLOADING, STORAGE AND PROCESSING AREAS [62-701.710(2)(d) FAC]

Proposed structures and areas designated for unloading, sorting, storage and loading, including dimensions, elevations and floor plans are shown in the attached drawings. These drawings also show the site's contours, drainage system, utilities and leachate collection system details.

6. ON-SITE STORAGE AREAS FOR RECYCLABLE MATERIALS, NON-PROCESSIBLE WASTES AND RESIDUES [62-701.710(2)(e)FAC]

All municipal solid waste received at the site will be disposed of in the transfer station or in the existing active landfill. No recyclable materials will be sorted from the waste stream. Tires will be collected at the CSA, ~~and~~ deposited in the tire collection area and managed in accordance with the facility's tire waste permit. White goods and automotive lead acid batteries will be collected for recycling at the CSA and stored in a clearly marked, separate area. White goods containing freon will have the freon removed.

7. DISPOSAL OF UNMARKETABLE RECYCLABLE GOODS MATERIALS AND RESIDUE [62-701.710(2)(f) FAC]

As described above, no sorting of municipal waste occurs at the Citrus County Solid Waste Transfer Station. Any unmarketable recyclable goods collected at the CSA will be transferred to the onsite landfill facility.

8. WASTE HANDLING DURING BREAKDOWNS IN OPERATIONS OR EQUIPMENT [62-701.710(2)(f) fac]

If, for any reason, the facility needs to be closed, or its operation curtailed, the refuse haulers will be diverted directly to the on-site landfill.

9.~~8.~~ BOUNDARY SURVEY, LEGAL DESCRIPTION AND TOPOGRAPHIC SURVEY [62-701.710(2)(g) FAC]

The Citrus County Board of County Commissioners owns while the Citrus County Solid Waste Management Division ~~owns and~~ operates the site located at 230 W Gulf to Lake Hwy, Lecanto, Florida. A copy of the boundary survey with legal description, quit claim deed and topographic survey is provided in Attachment G.

10.~~9.~~ OPERATIONS AND MAINTENANCE MANUAL, INSPECTION PLAN AND A CONTINGENCY PLAN [(62-701.710(2)(h) FAC) and (62-701.710(4) F.A.C.)]

Attachment H to Part B of this permit application is an Operation, Maintenance and Contingency Plan that describes the typical operation and maintenance procedures for the Citrus County Solid Waste Transfer Station in accordance with 62-701.710(4)(a)(1). Those descriptions include the following: the typical operation of the transfer station, the responsibilities of the transfer station's personnel and the equipment to be used at the transfer station; the contingency plan to be used in case of an emergency at the facility consistent with 62-701(4)(a)(3); and inspection plans for the solid waste and leachate in accordance with 62-701.710(4)(a)(2). ~~This document will be Appendix H to the Landfill Operations Plan on record with and approved by the Department.~~

11.~~10.~~ CLOSURE PLAN [62-701.710(2)(i) FAC and 62-701.710(6) FAC]

The County will notify Florida Department of Environmental Protection prior to the cessation of operation of the transfer station. When the proposed transfer station is ready to cease operations, no solid waste will be received at the transfer station after the specified date of closure.

- The County will remove and dispose all stored wastes and recyclable goods remaining at the transfer station within 30 days after the transfer station is closed.
- The facility will dispose of any leachate remaining at the time of closure.
- The CSA will be cleaned of waste by the County.
- Closure of the transfer station will be completed in 180 days. The County will certify to the FDEP in writing that the closure is complete.

12~~11~~. FINANCIAL ASSURANCE DOCUMENTATION [62-701.710(7) FAC, 62-701.710(2)(j) FAC and 62-701.710(10)(a) FAC]

In accordance with F.A.C. 62-701.710(10)(a), transfer stations, which accept primarily household waste, commercial waste or recovered materials, which manage waste on a first-in, first-out, and which store waste for no greater than 7 days are exempt from the requirement to provide financial assurance. In meeting this description, the Citrus County Solid Waste Transfer Station is exempt from providing financial assurance.

13~~12~~. STORMWATER MANAGEMENT [62-701.710(8) FAC]

A series of drainage swales collect and route the site's storm water runoff to on-site retention ponds. The site's stormwater systems are to be substantially modified as part of the proposed construction. The required application package has been submitted to the FDEP and has been deemed complete~~is currently in the review process~~.

~~13~~14. RECORD KEEPING [62-701.710(9) FAC]

Operational records are electronically recorded and maintained by the County including a daily log of the quantity of solid waste received and transported and the type of waste. Such records are compiled on a monthly basis and are available for inspection upon request, and with a reasonable amount of time by FDEP. Reports are retained for a period of three years.

15~~14~~. PROOF OF PUBLICATION OF THE NOTICE OF APPLICATION [62-701.320 (8) FAC, 62-110.106 FAC]

A public notice of application will be published within 14 days after submission of this application, and such proof of publication will be provided to the FDEP upon receipt.

16~~15~~. CONFORMANCE WITH PROHIBITIONS [62-701.300 FAC]

General Prohibitions **[62-701.300(1) FAC]**

62-701.300(1)(a):
No person shall store, process or dispose of solid waste except at a permitted solid waste management facility or a facility exempt from permitting under this chapter.

This is the permit application to Florida Department of Environmental Protection to operate the subject transfer station. The CSA, HHW and yard waste area are exempt from permitting under this rule.

62-701.300(1)(b):
No person shall store or dispose of solid waste in a manner or location that causes air quality standards to be violated or water quality standards or criteria of receiving waters to be violated.

The Citrus County Solid Waste Transfer Station ~~and~~ will not store solid waste in a manner or location that causes air quality standards to be violated. Best Management Practices are in place to avoid violations of water quality standards.

Siting **[62-701.300(2) FAC]**

Unless authorized ~~Unless authorized~~ by a Department permit or site certification in effect on May 27,2001, or unless specifically authorized by another Department or a Department permit or site certification based upon site-specific geological, design, or operational features, no solid waste shall be stored or disposed of by being placed:

62-701.300(2)(a):
In an area where geological formations or other subsurface features will not provide support for the solid waste;

Geotechnical explorations at the site have not indicated that there are geological formations or other subsurface features that will not provide support for the proposed solid waste facilities. This is further discussed in the project geotechnical report.

62-701.300(2)(b):
Within 500 feet of an existing or approved potable water well unless disposal takes place at a facility for which a complete permit application was filed or which was originally permitted before the potable water well was in existence. This prohibition shall not apply to any renewal of an existing permit that does not involve lateral expansion, nor to any vertical expansion at a permitted facility;

There does not appear to be any potable water wells within 500 feet of the transfer station site per the FDEP Water Central Database.

62-701.300(2)(c):
In a dewatered pit unless the pit is lined and permanent leachate containment and special design techniques are used to ensure the integrity of the liner;

Waste is not and will not be stored in a dewatered pit.

62-701.300(2)(d):
In an area subject to frequent and periodic flooding unless flood protection measures are in place;

The site is not located within flood prone areas. Waste will not be stored in areas subject to frequent and periodic flooding. As part of the facility

expansion, buildings will be constructed above the currently documented 100-year flood elevations

62-701.300(2)(e):
In any natural or artificial body of water including ground water;

Waste will not be stored in any natural or artificial body of water, nor in ground water.

62-701.300(2)(f):
Within 200 feet of any natural or artificial body of water, including wetlands within the jurisdiction of the Department, except bodies of water contained completely within the property boundaries of the disposal site, which do not discharge from the site to surface waters. A person may dispose of solid waste within the 200 foot setback area upon demonstration to the Department that permanent leachate control methods will result in compliance with water quality standards under Chapters 62-302 and 62-520, F.A.C. Stormwater control methods shall meet Stormwater requirements of Chapter 62-25, F.A.C. However, nothing contained herein shall prohibit the Department from imposing conditions necessary to assure that solid waste disposed of within the 200 foot setback area will not cause pollution from the site in contravention of Department rules.

The transfer station will not be located within 200 feet of any natural or artificial body of water.

62-701.300(2)(g):
On the right-of-way of any public highway, road or alley; and

Waste will not be stored on or within any public highway, road, or alley.

62-701.300(2)(h):
Within 1000 feet of an existing or approved potable water well serving a community water system as defined in rule 62-550.200(-12), F.A.C., unless storage or disposal takes place at a facility for which a complete permit application was filed or which was originally permitted before the water well was in existence. It is the intent of the Department that this provision shall be repealed on the effective date of any rule promulgated by the Department which regulates wellhead protection areas generally. This prohibition shall not apply to any renewal of an existing permit that does not involve lateral expansion, nor to any vertical expansion at a permitted facility.

This permit application is for a proposed transfer facility, which does not involve lateral or vertical expansion of a landfill. Therefore, the prohibition above is not applicable. Nonetheless, no community wells appear to be located within 1000 feet of the transfer station.

Burning **[62-701.300(3) FAC]**

Open burning of solid waste is prohibited except in accordance with Rule 62-256, F.A.C. Controlled burning of solid waste is prohibited except in a permitted incinerator, or in a facility in which the burning of solid waste is authorized by a site certification order issued under Chapter 403, Part II, F.S.

Waste will not be burned at the site.

Hazardous waste **[62-701.300(4) FAC]**

No hazardous waste shall be disposed of in a solid waste management facility unless such facility is permitted pursuant to Chapter 62-730, F.A.C.

Hazardous waste is not disposed of at the site. Household Hazardous/CESQG Waste collected at the site is hauled off site for proper disposal.

PCBs **[62-701.300(5) FAC]**

Disposal of liquids containing a polychlorinated biphenyl (PCB) or non-liquid PCBs in the form of contaminated soil, rags, or other debris, may be restricted or prohibited by 40 CFR Part 761. Persons managing PCBs are advised to consult that federal regulation before attempting to dispose of PCBs in any solid waste disposal unit in this state.

Liquids containing PCBs will not be knowingly accepted at the site.

Biomedical waste **[62-701.300(6) FAC]**

Biomedical waste shall be properly incinerated so that little or no organic material remains in the ash residue, or shall be processed by a method approved by the Department pursuant to Chapter 62-712, F.A.C. No untreated biomedical waste shall be knowingly deposited in any landfill.

Biohazardous waste will not be knowingly accepted at the site.

Class I surface waters **[62-701.300(7) FAC]**

The Department shall not issue a construction permit for a landfill within 3,000 feet of Class I surface waters.

This application is not for construction of a landfill. Therefore, the above prohibition is not applicable.

Special wastes for landfills. **[62-701.300(8) FAC]**

No person who knows or who should know of the nature of such solid waste shall dispose of the following wastes in any landfill:

62-701.300(8)(a):
Lead-acid batteries;

Automotive lead-acid batteries will not be accepted at the transfer station. Household and automotive lead-acid batteries will only knowingly be accepted at the HHW facility and the CSA. Batteries discovered by staff at the transfer station will be stored~~removed and will be isolated~~ in the tipping floor unauthorized waste holding~~a appropriate~~ area and then moved to the lead-acid storage area at the HHW~~until they are removed~~ by the end of the business day~~applicable vendor~~.

62-701.300(8)(b):
Used oil, except as provided in Chapter 62-710, F.A.C.

Used oil will only be accepted at the CSA.

62-701.300(8)(c):
Yard trash, except in unlined landfills classified by Department rule;

Vehicles containing yard trash will be diverted to the on-site Yard Waste Processing Facility.

62-701.300(8)(d):
White goods; and

White goods will be accepted at the CSA for recycling and proper disposal only and will not be permitted to be dumped on the tipping floor.

62-701.300(8)(e):
Whole waste tires, except as provided in Chapter 62-711, F.A.C.

Tires from non-commercial sources will be collected at the CSA only and managed in accordance with the tire waste facility permit.

Special wastes for waste-to-energy facilities **62-701.300(9) FAC]**
No person who knows or who should know of the nature of such solid waste shall dispose of lead-acid batteries in any waste-to-energy facility.

The transfer station is not a waste-to-energy facility.

Liquid restrictions **[62.701.300(10) FAC]**

62-701.300(10)(a):
Noncontainerized liquid wastes shall not be placed in solid waste disposal units unless;

1. The waste is household waste other than septic waste; or

2. The waste is leachate or gas condensate derived from the solid waste disposal unit; or byproducts of the treatment of such leachate or gas condensate, and the solid waste disposal unit is lined and has a leachate collection system.

Liquids will not be knowingly accepted at the transfer station.

62-701.300(10)(b):
Containers holding liquid waste shall not be placed in a solid waste disposal unit unless;

1. The container is a small container similar in size to that normally found in household waste;

2. The container is designed to hold liquids for use other than storage; or

3. The waste is household waste.

Liquids will not be knowingly accepted at the transfer station.

62-701.300(10)(c):
Containers or tanks twenty gallons or larger in capacity shall either have one end removed or cut open, or have a series of punctures around the bottom to ensure the container is empty and free of residue. The empty container or tank shall be compacted to its smallest practical volume for disposal.

Tanks will only be accepted at the CSA. Tanks twenty gallons or larger will be processed in accordance with this requirement.

Oily Wastes **[62-701.300(11) FAC]**

62-701.300(11)(a):
Except as provided in paragraph (b) of this subsection, no person may mix or commingle used oil with solid waste that is to be disposed of in landfills or directly dispose of used oil in landfills.

Used motor oil will be collected only at the CSA.

62-701.300(11)(b):
Oily wastes, sorbents or other materials used for maintenance or to clean up or contain leaks, spills or accidental releases of oil, and soils contaminated with used oil as a result of spills or accidental release are not subjected to the prohibition in paragraph (a) of this subsection.

Used motor oil will be collected only at the at CSA.

Yard trash **[62-701.300(12) FAC]**
The prohibition in paragraphs (2)(b), (f), and (h) of this section apply to the storage, processing, or disposal of yard trash, except that the following setback distances shall apply:

62-701.300(12)(a):
100 feet from off-site potable water wells, no setback required from on-site water wells;

The yard waste processing facility will not be within 100 feet of any known potable water wells.

62-701.300(12)(b):
50 feet from water bodies; and

The yard waste processing facility will not be within 50 feet of any water body except for on-site stormwater ponds.

62-701.300(12)(c):
200 feet from wells serving community water supplies.

The yard waste processing facility will not be within 200 feet of any community water supply well.

Tanks **[62-701.300(13) FAC]**
The prohibitions in subsection (2) of this section do not apply to the storage or treatment of soild waste in tanks which meet the criteria of Chapter 62-761 or subsection 62-701.400(6), F.A.C. Instead, no such storage tank shall be installed within 500 feet of any existing community water supply system or any existing non-transient non-community water supply system, nor shall any tank be installed within 100 feet of any other existing potable water supply well.

No solid waste ~~other than leachate~~ is stored in tanks at transfer station.

Indoor Solid Waste **[62-701.300(14) FAC]**
The prohibitions in subsection (2) of this section do not apply to the storage or processing of solid waste indoors, provided that the indoor storage area has an impervious surface and a leachate collection system. For the purposes of this subsection, an impervious surface means either a poured concrete pad having a minimum thickness of four inches, or an asphalt concrete paving with both a minimum thickness of one and one-half inches and with an additional component to restrict leaching to ground water such as soil cement sub-base, an epoxy seal or a geomembrane.

Solid waste will be stored on the tipping floor only when necessary. The tipping floor is composed of a concrete pad with a minimum thickness of twelve inches.

Storage in vehicles **[62-701.300(15) FAC]**
The prohibitions in subsection (2) of this section do not apply to the storage of solid waste in an enclosed or covered vehicle, provided that such vehicle has been unloaded or moved over public highways within the previous seven days.

Depending on the amount of waste received on a given day and on operations, waste may be stored in trailers only at the end of the business day. The waste will be transported off-site on the next business day.

Existing facilities **[62-701.300(16) FAC]**

Those portions of facilities, which were constructed prior to May 21, 2001, remain subject to the prohibitions that were in effect at the time the permit authorizing construction was issued. Lateral expansion of such facilities remain subject to the prohibitions that were in effect at the time of the permit authorizing the lateral expansion was issued. For example, portion of facilities constructed prior to May 19, 1994 were subject to the prohibition against storing or disposing of solid waste within 500 feet of an existing or approved shallow water supply well, but are not subject to the prohibitions of paragraph (2)(b) and (h) of this section. However, lateral expansions of such facilities which occurred after May 19, 1994 are subject to the prohibitions of paragraph (2)(b) and (h) of this section.

Construction on the site will be subject to all applicable prohibitions.

Attachment A
Solid Waste Collection Boundary and Fee Schedules

COMMERCIAL FEE SCHEDULE

OCTOBER 1, 2008 – SEPTEMBER 30, 2009

All loads covered or secured will be charged at the covered / secured load discount rate

WASTE DELIVERED BY REGISTERED NON-PROFIT ORGANIZATIONS WITH THRIFT SHOPS

SOLID WASTE.....$30.00 / Ton

BULKY WASTE: (Consists of furniture / carpet & padding / mattress & boxsprings) First 600 pounds per month each organization .....No Charge
All amounts thereafter. ... $30.00 / Ton

ELECTRONIC EQUIPMENT:
Televisions and computer monitors First 2 units per month each organization . . . No Charge
All amounts thereafter ... $8 00 each
Computer components and all other electronic items ..... No Charge

METAL APPLIANCES:
Refrigerators, Freezers, AC units First 2 units per month each organization .....No Charge
All amounts thereafter ..... $7.50 each
Propane Tanks up to 30-lb capacity. First 2 units per month each organization . ... No Charge
All amounts thereafter .....$2.50 each
Propane Tanks over 30-lb capacity First 2 units per month each organization ... . No Charge
All amounts thereafter .....$10.00 each
Other Metal Appliances . ... . .No Charge

TIRES:
Passenger car tires First 5 per month each organization .....No Charge
All amounts thereafter... $1 00 each or $95 00 / Ton

HAZARDOUS WASTE: Delivered by conditionally exempt small quantity generators
.....$2,000/ton (equal to $1 00 per pound)

PAINT PROGRAM: Latex & Oil Based / Aerosols / Tars
Delivered on non-program days.....$700.00 / Ton (equal to $0 35 per pound)

Hazardous Waste from Small Quantity (and Larger) Generators will not be accepted.

TRANSACTION FEE: . . $2 00 per visit for all paid items

DUPLICATE TICKET CHARGE..... $2.00 ea

LATE CUSTOMER CHARGE.....$1.50 per minute ...beginning 10 minutes after published closing

ELECTRONIC EQUIPMENT-COMMERCIAL:
Televisions and computer monitors..... $ 8.00 ea
Computer components and all other electronic items ..... No Charge

METAL APPLIANCES – COMMERCIALCHARGES:
Refrigerators, Freezers, A/C Units $ 7 50 ea
Propane Tanks up to 30-pound capacity $ 2 50 ea
Propane Tanks over 30-pound capacity ...$10 00 ea
Other Metal appliances (Stoves, Washers, etc) .....No Charge

TIRES – COMMERCIAL CHARGES:
Passenger Car Tires up to 5 . ... $1 00 each
Passenger Car Tires over 5.....$95.00 / Ton
Tractor Trailer Tires or smaller. ... $ 95.00 / Ton
Oversize tires any number $200 00 / Ton

FLUORESCENT LAMPS & MERCURY-CONTAINING DEVICES:
Businesses with less than 10 bulbs per month No Charge

COMMERCIAL UNIT RATES OVER 10 BULBS:
Straight 4' and 8' Fluorescent Lamps $ 0 80
Compact Fluorescent Lamps $ 1 00
High Intensity Discharge Lamps (HIDS)..... $ 2.50
Irregular Shaped Lamps ..... $ 1 00
Mercury Containing Devices*..... $ 1.00
(*thermostats, switches, thermometers, etc)

SCRAP METAL:... No Charge
All lawn equipment must have fluids drained

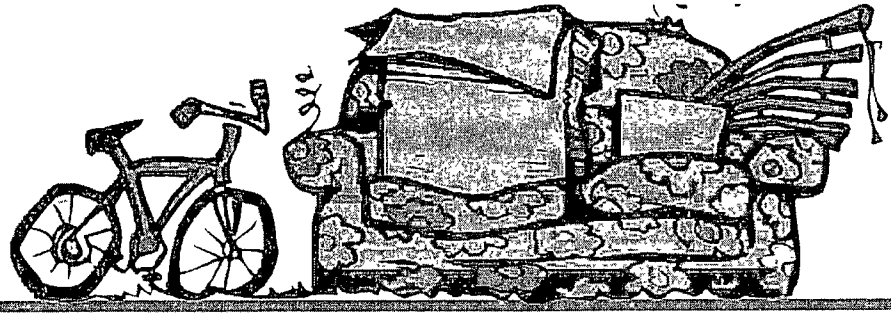
TIPPING FEES:
Non-Contract Haulers & Commercial Self-Haul .....$70.00 / Ton
Covered / secured load discount rate .....60.00 / Ton
Contract Haulers $40 00 / Ton
Covered / secured load discount rate .....$30.00 / Ton
City Trucks/City Contract Haulers $55 00 / Ton
Covered / secured load discount rate .....$45 00 / Ton
Roll-off containerized waste from unincorporated areas $70 00 / Ton
Covered / secured load discount rate $60 00 / Ton
Roll-off containerized waste from cities ..$55 00 / Ton
Covered / secured load discount rate ... $45.00 / Ton
Mixed-City/County Routes Blended Rate
Out of County Waste Per Agreement with BOCC Only

YARD WASTE*: ..... $32 50 / Ton
Covered / secured load discount rate.....$22.50 / Ton
Residential Christmas Trees (Dec. & Jan only) .....No Charge

**Stumps in excess of 4 ft in diameter will not be accepted*
Logs in excess of 4 ft in diameter or in excess of 10 ft in length will not be accepted

SPECIAL WASTE: $90 00 / Ton
(1)Asbestos, Sludge, Oil-Contaminated Materials by staff pre-approval only, (2) Whole Boats or Trailers greater than 14 feet, (3) Items Requiring Verified Burial

WASTE RELOCATION CHARGE..... $90 00 per Hour (1 Hour Minimum Charge)



RESIDENTIAL FEE SCHEDULE

OCTOBER 1, 2008 – SEPTEMBER 30, 2009

All loads covered or secured will be charged at the covered / secured load discount rate

TRANSACTION FEE: .....**2.00 per visit for all paid items**
To include disposal of up to 4 bags / cans of solid waste / trash or yard waste

LOST INBOUND CARD.....**$10.00**

LATE CUSTOMER CHARGE.....**$1.50 per minute**
... .begins 10 minute after published closing

BAGGED WASTE:
Residential Solid Waste/Trash per 30-Gal Bag/Can –
..... No additional charge up to 4 bags/cans.
. ... . .$0.50 per bag/can from 5 to 9 bags/cans.
. .10 bags/cans and over will be weighed at $30 00 per ton.
Residential Yard Waste per 30-Gal Bag/Can –
.. .. No additional charge up to 4 bags/cans.
$0.20 per bag/can from 5 to 9 bags/cans
.... 10 bags/cans and over will be weighed at $22.50/ton

NON-BAGGED WASTE:
Residential Solid Waste/Trash. . .. .. $40 00 / Ton
Covered / Secured load discount rate .....$30.00 / Ton
Residential Yard Waste*. $32.50 / Ton
Covered / Secured load discount rate $22 50 / Ton
Residential Christmas Trees – Dec & Jan only
. . . .No Charge
**Stumps in excess of 4 ft in diameter will not be accepted. Logs in excess of 4 ft in diameter or in excess of 10 ft in length will not be accepted*

BULKY WASTE RESIDENTIAL SELF-HAUL:.....
. ...No Charge
(Consists of furniture/carpet & padding/mattress & boxsprings)

ELECTRONIC EQUIPMENT- RESIDENTIAL NO CHARGE:
Televisions and computer monitors ... .
. . . . ..*Maximum 2/ visit & 4/ year
Computer components & all other electronic items
.... .No Charge

FLUORESCENT LAMPS & MERCURY-CONTAINING DEVICES:
Residential up to 10 per month.... ....No Charge

METAL APPLIANCES - RESIDENTIAL NO CHARGE:
Refrigerators, Freezers, A/C Units
. *Maximum 2/ visit & 4/ year
Propane Tanks up to 30-lb capacity
.. .. *Maximum 2/ visit & 4/ year
Propane Tanks over 30-lb capacity .
*Maximum 2/ visit & 4/ year
Other Metal appliances (Stoves, Washers, etc)
. ... No Limit

SCRAP METAL: . . . .No Charge
All lawn equipment must have fluids drained

SORTED CLEAN RECYCLABLES: . . .. No Charge
Aluminum or Steel Cans, Newspaper, Cardboard, Glass Bottles, Plastic Milk & Soda Bottles, Plastic Flower Pots
Additional Recyclables Lead Acid and Nickel Cadmium (Ni-Cad) Batteries, Used Oil and Anti-Freeze, limit 5 gallons per visit

TIRES:
Residential Passenger Car Tires up to 5 .....*No Charge
*Maximum 5 per visit and 10 per year
Residential Passenger Car Tires over 5 . $ 95 00 / Ton
Tractor trailer or smaller . . . . $ 95.00 / Ton
Residential Oversize tires any number . $200 00 / Ton

*Additional items above the no charge per visit rate will be charged in accordance with the individual disposal rates as indicated in the commercial fee schedule

HOUSEHOLD HAZARDOUS WASTE: Delivered by residents on non-program days
.....$700 / Ton (equal to $0.35 per pound)

PAINT PROGRAM: Latex & Oil Based / Aerosols / Tars Delivered by residents on non-program days
.. . ..$700.00 / Ton (equal to $0 35 per pound)

SPECIAL WASTE:..... .. ..$90.00 / Ton
(1)Asbestos, Sludge, Oil-Contaminated Materials by staff pre-approval only, (2) Whole Boats or Trailers greater than 14 feet, (3) Items Requiring Verified Burial

WASTE RELOCATION CHARGE . $90 00 per Hour
(1 Hour Minimum Charge)

ANNUAL RESIDENTIAL SELF-HAUL ADVANCE DISPOSAL PAYMENT PROGRAM

October 1st through September 30th
INCLUDES TIPPING FEE & TRANSACTION FEE

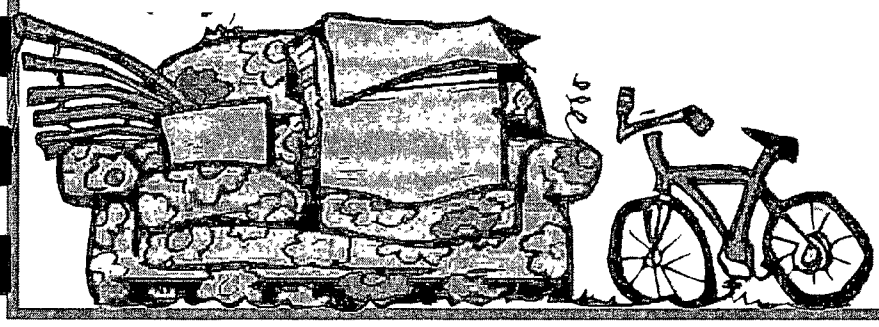
BAGGED HOUSEHOLD GARBAGE
FIVE 30 GALLON CONTAINERS PER WEEK
Renewal by mail only 10/1/08 through 12/31/08 $50 per vehicle

One time annual fee based on purchase date:
Oct. 1 – Dec. 31 ....$60 per Vehicle
Jan. 1 – Mar 31 ... .$45 per Vehicle
Apr 1 – June 30 . ...$30 per Vehicle
July 1 – Sept 30. .. . .$15 per Vehicle

BAGGED HOUSEHOLD GARBAGE & BAGGED YARD WASTE
FIVE 30 GALLON CONTAINERS PER WEEK, EACH MATERIAL
Renewal by mail only 10/1/08 through 12/31/08 $70 per vehicle

One time annual fee based on purchase date:
Oct. 1 – Dec. 31 ....$80 per Vehicle
Jan 1 – Mar 31 . $60 per Vehicle
Apr. 1 – June 30 . ... $40 per Vehicle
July 1 – Sept 30 . . $20 per Vehicle

Loads may be combined with "No Charge" items up to per-visit limits and still use bypass lane
Loads that contain items for which there is a charge must use the scale lane.



EMERGENCY FEE SCHEDULE

OCTOBER 1, 2008 – SEPTEMBER 30, 2009

This fee schedule may be implemented under the following conditions:

Locally declared state of emergency,

or

Failure of the landfill's normal and backup power supply, scales, scalehouse building and/or computers for scalehouse management system.

This fee schedule will be terminated and the regular fee schedule will be reinstated under the following conditions:

Return of function for power, scales, scalehouse building and/or computers for the scalehouse management system

or

Termination of state of emergency

or

Direction of BOCC

Charge customers – certified waste collectors

Front load and rear load route trucks. Weight is equal to the maximum load weight for that collection vehicle, for the same waste type, within the past 30 days Rate is the normal per ton rate. If the truck has no visits during the period of record, use the most similar truck (type, capacity) from the same collection company for the maximum load.

Roll-off truck with open-top box. Weight is equal to the density calculated for landfill CSA waste boxes times the capacity of the open-top box. Rate is the normal per ton rate.

Compactor roll-off boxes. Weight is equal to the maximum weight for that container within the past 30 days. Rate is normal per ton rate. If the container has no visits during the period of record, use the most similar container from the same collection company for the maximum load

Receipts will be manual tickets indicating date, time, truck number and material and if applicable, roll-off container capacity

Charge customers - all others

See below

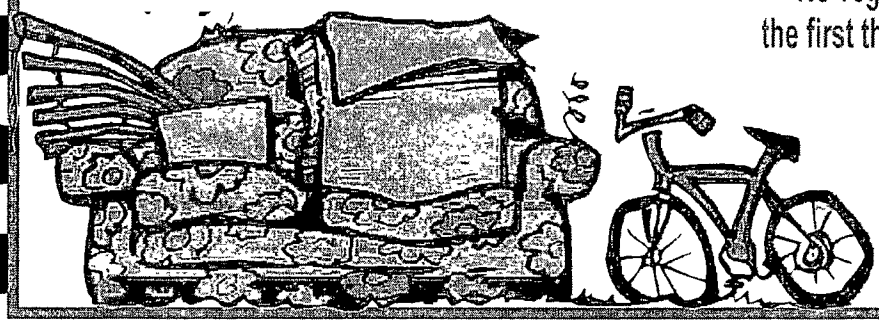
Residential and commercial cash customers – prices include transaction fee

Car or van	$3.00
Single axle pickup truck	$9 00
Dual axle pickup truck	$18.00
Car or van with trailer	$6.00
Pickup truck with trailer <12 feet long	$18 00
Pickup truck with trailer > 12 feet long	$27.00
Dual rear axle truck with trailer <12 feet long	$36 00
Dual rear axle truck with trailer > 12 feet long	$60.00

Dump trucks - Weight is equal to the density calculated for landfill CSA waste boxes times the capacity of the dump bed Rate is the normal per ton rate

Items that are normally free for residents will be charged Material separation for disposal location remains in effect Receipts for all transactions (if requested) will be manual tickets indicating date, and cash amount paid

No vegetative debris will be accepted during the first three (3) days following a natural disaster.



Attachment B
Waste Projections

King
ENGINEERING ASSOCIATES, INC

4921 Memorial Highway, Suite 300
Tampa, Florida 33634
(813) 880-8881 ♦ (813) 880-8882 fax
www.kingengineering.com

MEMORANDUM

To:	Distribution
From:	Jennifer Meisenhelder
Subject:	REVISED Tonnage Projections

Date:	May 23, 2007
Project No.:	4217-001-000
Project Name:	Citrus County Solid Waste Transfer Station and Associated Site Improvements

As part of the Citrus County Solid Waste Transfer Station and Associated Site Improvements project, current municipal solid waste tonnage trends were analyzed and projected for the design twenty-year lifetime of the new transfer station facility. An outline of the methodologies utilized in the projections through 2030 are as follows:

- Tonnage data was compiled and processed by Citrus County for FY 2005 and FY 2006. The data returned monthly tonnage and transaction values for numerous product codes assigned to customers of the CSA and the Landfill. King focused on the 900 family of the product code for Municipal Solid Waste (MSW), that includes commercial haulers traveling directly to the landfill and self-haulers who deposit their garbage at the CSA, which is subsequently removed to the landfill via roll-off containers It has been assumed that all tonnage with a 900 family product code presently being handled by the landfill will be processed by the proposed transfer station in the future. The partitioning of the CSA tonnage data from the overall data is due to its contribution to design parameters for both the proposed transfer station and the proposed CSA expansion The distinction of product codes used in this analysis are provided in Table 2.

- Population projection data for Citrus County were taken from the University of Florida Bureau of Economic and Business Research (BEBR), Volume 40 Bulletin 147. Population trends were based on a range of projections that included low, medium and high estimates in 5-year increments

- Years previous to 2006 were assumed to decrease in population proportionally to the low, medium and high estimates of growth after 2006. The use of population projection prior to 2006 allows for comparison of model performance with real historical data The interpolated projection data used in this analysis may be found in Table 3

- Daily averages for each month were calculated based on a 6 day work week for FY 2005 and FY 2006 for the Landfill, CSA and Total tonnage. The average daily tonnage for 2006 was used as the basis of the low, medium and high projections. The average daily tonnages for 2005 for the CSA and the landfill were plotted on the graphs 1, 2 and 3 for comparison with projected data Combining daily tonnages from the CSA and Landfill 900 family codes yields the total amount of MSW the transfer station would receive under average conditions (See Tables 4 and 5 and Graph 3) As shown on the graphs, the reverse projected tonnages for 2005 are lower for MSW delivered directly to the landfill, higher for MSW delivered to the CSA, but within one (1) to five (5) tons for the total MSW delivered to the landfill. This indicates that the projections for the total MSW appear to be in order; however, between 2005 and 2006, the amount of MSW delivered to the CSA increased at a faster rate than the population and the amount of MSW delivered directly to the landfill increased at a slower rate than the population.

- A peaking factor to ascertain the peak day MSW generation for the future was established by taking the 6 highest cash days and 6 highest invoice days for FY 2006 and analyzing the product codes that contribute to the landfill or the CSA. Cash and invoice days are indicative of high self-hauler/CSA days and Commercial hauler/Landfill days respectively. The tonnages for these days were averaged over 6 days and divided by the average daily tonnages for the CSA and Landfill, yielding peaking factors that were then applied to the projected tonnages (See Table 6). While it is recognized that peak tonnage for the CSA historically occurs on Saturdays and commercially hauled tonnage tends to peak during the week, the two peak tonnages were added together to allow for future flexibility in operating conditions such as commercial and self haulers peaking on the same day, and/or the County implementing universal collection (See Graph 4, 5 and 6 for Peak Day Tonnage for the CSA, Landfill and Transfer Station, respectively).

The 2006 BEBR data indicate that Citrus County could experience an average of 0 82% population growth for the low projection, 1.7% for the medium growth or 2.6% for the high growth. Comparing actual population numbers from the 2002 BEBR report (Volume 36 Number 1 Bulletin 134) and the 2006 report indicate that between April 1, 2002 and April 1, 2006, the

population of Citrus County increased an average of 2.7% annually. This suggests that the high growth estimate may be more indicative to the actual future growth of Citrus County

Based on the above, we recommend the following tonnages be used for the project.

Table 1. Recommended Tonnages

	Average Daily (Tons/day)	Peak Daily (Tons/day)
Direct to Landfill	500	705
CSA	90	135
Total to Transfer Station	590	840
Transfer Station Design	575	850

Note that the 600 ton per day average day capacity equals the capacity required in Section 4.1 of Appendix A in Attachment 2 of the County's RFQP for Solid Waste Transfer, Transport and Disposal services

Please provide your concurrence with those values

cc: Glenn McCracken, Citrus County
Susie Metcalfe, Citrus County
Mike Arnold, Citrus County
Carmen Bruno, Citrus County
Bo Bruner, CH2M HILL
Chuck Kemper, CH2M HILL
Jennifer Meisenhelder, King
File 4217-001-000 (100)

Citrus County Solid Waste Transfer Station and Associated Site Improvements

Table 2.

Material Codes

	PRODUCT	CATEGORY	NAME
LANDFILL	900	900	GARBAGE TO CLASS I CELL
	900	900U	UNCOVERED GARBAGE TO CLASS I CELL
	900	90F	FREE GARBAGE CLASS I CELL
	900	90H	GARBAGE @50% CLASS I CELL
	900	90R	RECYCLING TRASH TO CELL
	900	920	ROLL-OFF FROM UNINCORPORATED
	900	920U	UNCOVERED ROLL-OFF FROM UNINCORPORATED
	900	925	ROLL-OFF FROM CITIES
	900	925U	ROLL-OFF FROM CITIES
	900	945	MUNICIPAL RATE@ 45 00 a Ton
	900	945U	UNCOVERED MUNICIPAL RATE@ 45 00 a Ton

CSA	900	51	30 GAL BAGS OR EQUIVALENT
	900	52	30 GAL BAGS OR EQUIVALENT
	900	53	30 GAL BAGS OR EQUIVALENT
	900	54	30 GAL BAGS OR EQUIVALENT
	900	55	30 GAL BAGS OR EQUIVALENT
	900	56	30 GAL BAGS OR EQUIVALENT
	900	57	30 GAL BAGS OR EQUIVALENT
	900	58	30 GAL BAGS OR EQUIVALENT
	900	59	30 GAL BAGS OR EQUIVALENT
	900	600	RECYCLE ALLEY SCALE TRASH
	900	600NP	NON PROFIT R/A SCALE TRASH FREE
	900	600U	UNCOVERED RECYCLE ALLEY SCALE TRASH
	900	60F	FREE TRASH TO ROLLOFFS
	900	60H	TRASH @ 50% TO ROLLOFFS
	900	9NC	NOT CERTIFIED OR ASSESSED
	900	9NCU	UNCOVERED NOT CERTIFIED OR ASSESSED

Citrus County Solid Waste Transfer Station and Associated Site Improvements

Table 3.
Population Projections

Year	Low Estimate	% Change	Moderate Estimate	% Change	High Estimate	% Change
2002	130,589		125,253		120,569	
2003	132,076	1 1	127,942	2 1	124,244	3 0
2004	133,598	1 1	130,749	2 1	128,150	3 0
2005	135,155	1 2	133,682	2 2	132,310	3 1
2006	**136,749**	**1.2**	**136,749**	**2.2**	**136,749**	**3.2**
2007	138,362	1 2	139,887	2 2	141,337	3 2
2008	139,975	1 2	143,025	2 2	145,925	3 1
2009	141,587	1 1	146,162	2 1	150,512	3 0
2010	143,200	1 1	149,300	2 1	155,100	3 0
2011	144,700	1 0	152,140	1 9	159,480	2 7
2012	146,200	1 0	154,980	1 8	163,860	2 7
2013	147,700	1 0	157,820	1 8	168,240	2 6
2014	149,200	1 0	160,660	1 8	172,620	2 5
2015	150,700	1 0	163,500	1 7	177,000	2 5
2016	151,860	0 8	166,120	1 6	181,440	2 4
2017	153,020	0 8	168,740	1 6	185,880	2 4
2018	154,180	0 8	171,360	1 5	190,320	2 3
2019	155,340	0 7	173,980	1 5	194,760	2 3
2020	156,500	0 7	176,600	1 5	199,200	2 2
2021	157,280	0 5	178,900	1 3	203,660	2 2
2022	158,060	0 5	181,200	1 3	208,120	2 1
2023	158,840	0 5	183,500	1 3	212,580	2 1
2024	159,620	0 5	185,800	1 2	217,040	2 1
2025	160,400	0 5	188,100	1 2	221,500	2 0
2026	160,940	0 3	190,260	1 1	226,120	2 0
2027	161,480	0 3	192,420	1 1	230,740	2 0
2028	162,020	0 3	194,580	1 1	235,360	2 0
2029	162,560	0 3	196,740	1 1	239,980	1 9
2030	163,100	0 3	198,900	1 1	244,600	1 9

Notes

** Population projection data for Citrus County originated from Florida Population Studies created by the Bureau of Economic Research (BEBR) from the University of Florida*

** Population trends were based on a range of projections that included low, medium and high estimates of population projected in 5-year increments from an April 2006 beginning estimate*

** Yearly growth was estimated by linearly interpolating between increments and years previous to 2006 were assumed to decrease in population proportionally to the low, medium and high etimates of growth after 2006*

** Citrus County population from 2002-2006 provided by Citrus Cunty Community Development Division*

Citrus County Solid Waste Transfer Station and Associated Site Improvements
Table 4.
Tonnage Data By Month For FY 2005

	PRODUCT	CATEGORY	NAME	October	November	December	January	February	March	April	May	June	July	August	September
DIRECTLY TO LANDFILL	900	900	GARBAGE TO CLASS I CELL	4,533 72	6,617 12	6,905 98	7,048 92	6,489 14	7,925 45	7,187 25	6,878 48	7,502 39	6,919 68	7,371 88	6,662 75
	900	900U	UNCOVERED GARBAGE TO CLASS I CELL												
	900	90F	FREE GARBAGE CLASS I CELL	30 50	43 93	30 99	32 79	15 12	39 83	31 06	34 74	53 04	38 88	29 14	29 22
	900	90H	GARBAGE @50% CLASS I CELL												
	900	90R	RECYCLING TRASH TO CELL	11 07	19 18	13 54	14 87	14 56	22 57	26 71	16 78	22 09	26 93	20 95	18 70
	900	920	ROLL-OFF FROM UNINCORPORATED												
	900	920U	UNCOVERED ROLL-OFF FROM UNINCORPORATED												
	900	925	ROLL-OFF FROM CITIES												
	900	925U	ROLL-OFF FROM CITIES												
	900	945	MUNICIPAL RATE@ 45 00 a Ton	262 94	293 25	245 84	169 81	195 31	201 44	240 52	181 19	199 32	228 35	205 68	148 42
	900	945U	UNCOVERED MUNICIPAL RATE@ 45 00 a Ton												
			AVERAGE DAY =	186 09	268 21	276 78	269 13	279 76	303 31	299 42	263 38	299 11	277 46	282 51	274 36
CSA	900	51	30 GAL BAGS OR EQUIVALENT	4 78	6 26	6 28	6 10	6 44	6 86	7 70	5 18	5 06	5 80	3 58	2 78
	900	52	30 GAL BAGS OR EQUIVALENT	28 72	42 88	40 24	38 52	33 92	36 80	40 12	36 84	30 12	20 76	13 24	7 44
	900	53	30 GAL BAGS OR EQUIVALENT	20 16	33 42	32 76	31 20	31 62	34 08	31 26	27 78	25 38	16 50	11 88	6 00
	900	54	30 GAL BAGS OR EQUIVALENT	46 56	84 56	91 92	100 80	103 84	127 20	127 92	117 60	146 72	181 52	199 52	214 96
	900	55	30 GAL BAGS OR EQUIVALENT	24 40	36 80	32 40	34 40	22 70	28 40	32 30	25 30	23 60	24 40	28 80	28 30
	900	56	30 GAL BAGS OR EQUIVALENT	26 40	43 68	50 88	57 24	56 28	63 60	78 60	60 00	62 64	67 92	57 24	54 96
	900	57	30 GAL BAGS OR EQUIVALENT	11 06	12 60	13 02	15 96	11 34	12 74	13 72	8 82	10 08	9 38	9 80	9 52
	900	58	30 GAL BAGS OR EQUIVALENT	14 72	29 76	29 12	26 40	25 44	31 84	41 12	25 76	25 28	32 16	21 28	24 64
	900	59	30 GAL BAGS OR EQUIVALENT	13 32	17 82	18 36	16 38	14 22	14 40	26 10	19 80	15 12	18 54	18 36	14 94
	900	600	RECYCLE ALLEY SCALE TRASH	432 39	675 29	547 46	725 90	687 72	745 47	772 28	673 44	778 00	665 78	737 12	634 14
	900	600NP	NON PROFIT R/A SCALE TRASH FREE	21 94	29 53	32 57	25 08	18 07	25 80	31 70	41 60	44 53	36 98	37 78	34 18
	900	600U	UNCOVERED RECYCLE ALLEY SCALE TRASH												
	900	60F	FREE TRASH TO ROLLOFFS	81 45	110 85	105 15	113 70	109 50	122 55	138 60	113 55	123 15	126 30	131 85	118 80
	900	60H	TRASH @ 50% TO ROLLOFFS		1 03	0 19	0 62	0 92		0 43			2 39	0 25	
	900	9NC	NOT CERTIFIED OR ASSESSED	59 88	81 70	51 74	50 55	72 88	99 62	87 34	74 54	72 31	67 29	70 04	71 94
	900	9NCU	UNCOVERED NOT CERTIFIED OR ASSESSED												
			AVERAGE DAY =	30 22	46 39	40 47	46 03	49 79	49 98	57 17	45 56	52 38	49 07	49 66	48 90

CALCULATIONS

ANNUAL TONNAGE DIRECTLY TO THE LANDFILL =	3,279
AVERAGE DAILY TONNAGE TO THE LANDFILL =	273
MAX MONTHLY TONNAGE TO THE LANDFILL =	303
ANNUAL TONNAGE TO THE CSA =	566
AVERAGE DAILY TONNAGE TO THE CSA =	47
MAX MONTHLY TONNAGE TO THE CSA =	57
ANNUAL TONNAGE TO THE TRANSFER STATION ** =	3,845
AVERAGE DAILY TONNAGE TO THE TRANSFER STATION =	320
MAX MONTHLY TONNAGE TO THE TRANSFER STATION =	360

** Transfer station tonnage includes tonnage going directly to the present day landfill and MSW collected at the CSA

Citrus County Solid Waste Transfer Station and Associated Site Improvements
Table 5.
Tonnage Data By Month For FY 2006

	PRODUCT	CATEGORY	NAME	October	November	December	January	February	March	April	May	June	July	August	September
	900	900	GARBAGE TO CLASS I CELL	5,523 66	6,474 54	6,732 88	5,785 26	6,221 35	7,056 21	6,394 52	6,700 42	6,652 92	6,271 06	6,610 11	6,046 63
	900	900U	UNCOVERED GARBAGE TO CLASS I CELL									0 16			
	900	90F	FREE GARBAGE CLASS I CELL	42 69	27 60	69 07	43 69	22 14	21 26	47 78	34 59	22 01	25 18	62 44	25 67
	900	90H	GARBAGE @50% CLASS I CELL												
	900	90R	RECYCLING TRASH TO CELL	24 62	23 32	23 11	25 03	19 16	27 37	19 19	14 33	24 65	26 75	21 78	33 11
LANDFILL	900	920	ROLL-OFF FROM UNINCORPORATED	272 73	501 50	526 80	459 96	590 20	648 73	608 16	624 20	658 18	617 41	682 12	565 53
	900	920U	UNCOVERED ROLL-OFF FROM UNINCORPORATED				5 13								
	900	925	ROLL-OFF FROM CITIES	96 87	150 90	159 26	130 04	119 66	137 74	99 05	134 87	155 45	140 74	158 19	130 19
	900	925U	ROLL-OFF FROM CITIES												
	900	945	MUNICIPAL RATE@ 45 00 a Ton		16 89	6 24				1 76		6 49			0 89
	900	945U	UNCOVERED MUNICIPAL RATE@ 45 00 a Ton												
			AVERAGE DAY =	229 25	276 72	289 13	238 86	290 52	292 27	286 82	278 09	289 23	272 35	279 06	272 08
	900	51	30 GAL BAGS OR EQUIVALENT	2 90	2 74	2 86	1 38	1 76	2 40	0 74	1 54	1 04	1 08	0 78	1 00
	900	52	30 GAL BAGS OR EQUIVALENT	8 68	6 68	4 36	1 80	1 96	5 04	1 72	3 36	2 24	2 32	2 32	1 84
	900	53	30 GAL BAGS OR EQUIVALENT	6 90	6 72	3 96	2 64	2 88	5 34	3 06	3 48	2 46	3 42	3 60	1 92
	900	54	30 GAL BAGS OR EQUIVALENT	174 32	210 32	239 12	224 16	234 00	276 72	273 52	270 72	254 00	257 68	240 72	247 04
	900	55	30 GAL BAGS OR EQUIVALENT	20 30	21 60	20 80	19 10	20 00	25 80	23 90	22 50	23 40	19 50	17 10	21 60
	900	56	30 GAL BAGS OR EQUIVALENT	63 84	55 68	70 20	63 96	61 80	81 84	76 92	78 00	77 76	75 24	72 60	93 96
	900	57	30 GAL BAGS OR EQUIVALENT	7 70	7 28	7 00	4 76	7 00	10 22	8 26	7 84	8 68	6 44	6 86	6 58
CSA	900	58	30 GAL BAGS OR EQUIVALENT	23 04	28 96	42 56	32 96	27 68	36 00	37 92	38 72	39 52	33 92	38 24	47 84
	900	59	30 GAL BAGS OR EQUIVALENT	11 88	24 12	19 80	22 32	17 64	24 30	25 56	24 84	28 08	20 16	28 26	35 64
	900	600	RECYCLE ALLEY SCALE TRASH	549 76	529 02	514 05	564 61	,569 52	750 92	674 07	640 10	684 22	616 28	599 31	581 08
	900	600NP	NON PROFIT R/A SCALE TRASH FREE	1 51	2 72	1 53	1 20	1 28	1 50	1 00	1 79	1 79	6 53	1 90	1 50
	900	600U	UNCOVERED RECYCLE ALLEY SCALE TRASH	197 33	115 51	95 37	76 87	67 32	72 46	100 35	125 88	126 10	95 71	68 16	59 10
	900	60F	FREE TRASH TO ROLLOFFS	109 20	120 90	108 60	101 40	96 90	119 25	110 85	106 65	94 35	103 95	94 05	90 45
	900	60H	TRASH @ 50% TO ROLLOFFS					0 54							
	900	9NC	NOT CERTIFIED OR ASSESSED	54 49	53 53	92 07	73 10	77 37	162 05	75 79	100 40	87 76	103 62	98 28	67 66
	900	9NCU	UNCOVERED NOT CERTIFIED OR ASSESSED	2 82	1 09	1 72	0 06	0 11	0 88		1 15	1 56	1 89	1 85	3 49
			AVERAGE DAY =	47 49	45 65	47 08	44 09	49 49	58 32	56 55	52 85	55 11	51 84	47 19	50 43

CALCULATIONS

ANNUAL TONNAGE DIRECTLY TO THE LANDFILL =	3,294
AVERAGE DAILY TONNAGE TO THE LANDFILL =	275
MAX MONTHLY TONNAGE TO THE LANDFILL =	292
ANNUAL TONNAGE TO THE CSA =	606
AVERAGE DAILY TONNAGE TO THE CSA =	51
MAX MONTHLY TONNAGE TO THE CSA =	58
TOTAL TONNAGE TO THE TRANSFER STATION ** =	3,900
AVERAGE DAILY TONNAGE TO THE TRANSFER STATION =	325
MAX MONTHLY TONNAGE TO THE TRANSFER STATION =	351

** Transfer station tonnage includes tonnage going directly to the present day landfill and MSW collected at the CSA

Citrus County Solid Waste Transfer Station and Associated Site Improvements
Table 6.
Tonnages for the Top 6 Peak Days of FY 2006

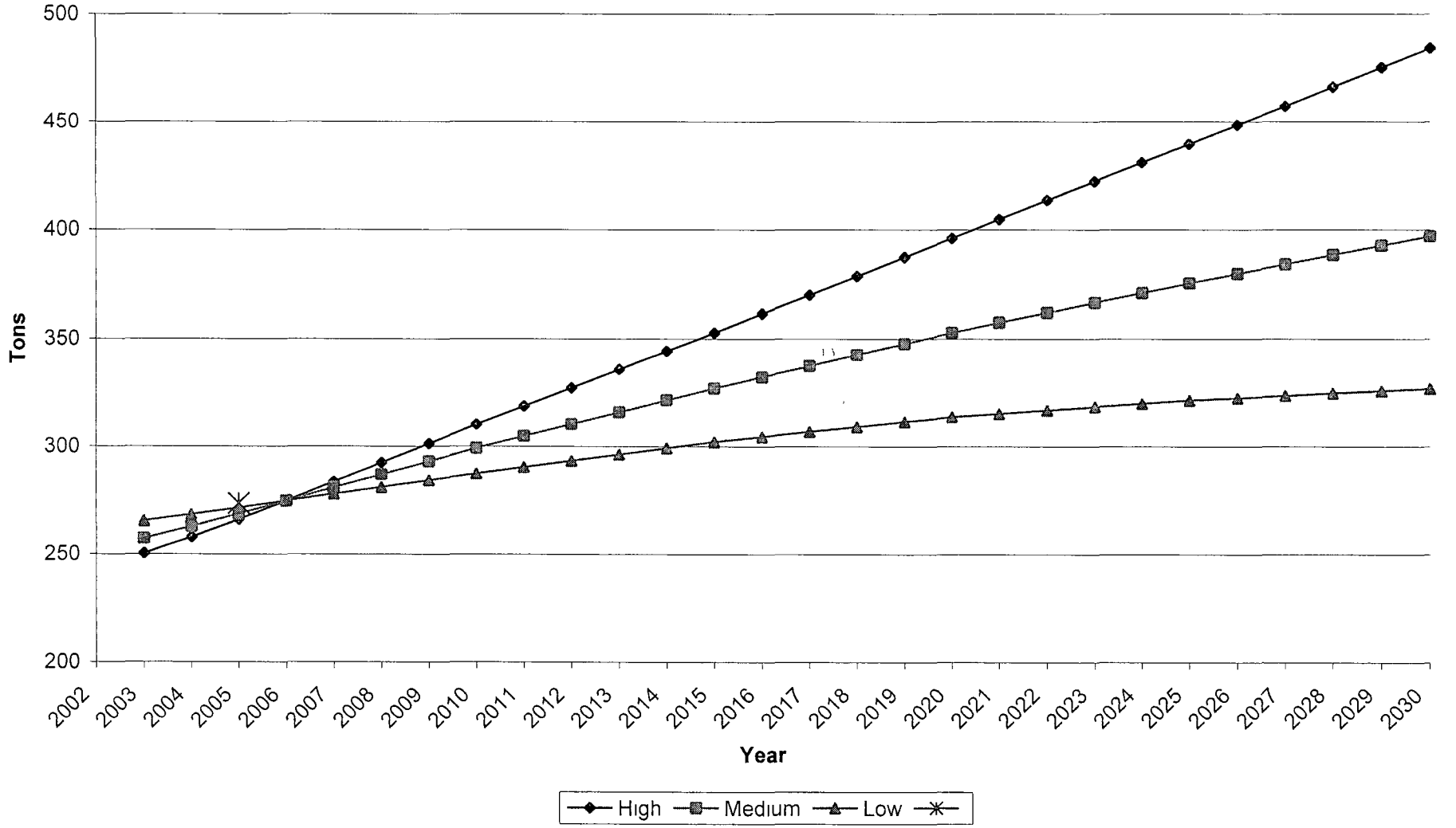
	PRODUCT	CATEGORY	NAME	INVOICE PEAK DAY 1 (06/14/06)	INVOICE PEAK DAY 2 (03/07/06)	INVOICE PEAK DAY 3 (03/14/06)	INVOICE PEAK DAY 4 (05/16/06)	INVOICE PEAK DAY 5 (04/18/06)	INVOICE PEAK DAY 6 (04/14/06)
LANDFILL	900	900	GARBAGE TO CLASS I CELL	398 83	340 72	330 29	312 74	318 16	293 55
	900	900U	UNCOVERED GARBAGE TO CLASS I CELL						
	900	90F	FREE GARBAGE CLASS I CELL	2 88	2 33	1 13	0 34	2 19	1 17
	900	90H	GARBAGE @50% CLASS I CELL						
	900	90R	RECYCLING TRASH TO CELL	4 85		2 33	1 77	1 68	
	900	920	ROLL-OFF FROM UNINCORPORATED	63 27	53 21	50 33	28 04	17 73	27 54
	900	920U	UNCOVERED ROLL-OFF FROM UNINCORPORATED						
	900	925	ROLL-OFF FROM CITIES	33 16	28 54	14 42	22 50	15 11	28 92
	900	925U	ROLL-OFF FROM CITIES						
	900	945	MUNICIPAL RATE@ 45 00 a Ton						
	900	945U	UNCOVERED MUNICIPAL RATE@ 45 00 a Ton						
		OTHER	30-YARD BOX PULLS						
			TOTAL TONNAGE	503	425	399	365	355	351

	PRODUCT	CATEGORY	NAME	CASH PEAK DAY 1 (01/03/06)	CASH PEAK DAY 2 (12/27/05)	CASH PEAK DAY 3 (04/01/06)	CASH PEAK DAY 4 (03/18/06)	CASH PEAK DAY 6 (02/25/2006)	CASH PEAK DAY 5 (02/18/06)
CSA	900	51	30 GAL BAGS OR EQUIVALENT	0 18	0 14		0 02	0 30	0 04
	900	52	30 GAL BAGS OR EQUIVALENT	0 12	0 20		0 28	0 08	0 08
	900	53	30 GAL BAGS OR EQUIVALENT	0 12	0 24		0 18	0 12	0 30
	900	54	30 GAL BAGS OR EQUIVALENT	18 48	17 84	15 52	12 40	11 60	13 12
	900	55	30 GAL BAGS OR EQUIVALENT	1 20	1 30	2 00	2 00	1 20	1 40
	900	56	30 GAL BAGS OR EQUIVALENT	7 68	6 12	5 16	7 32	5 76	3 72
	900	57	30 GAL BAGS OR EQUIVALENT	0 42	0 42	0 56	0 42	0 42	0 70
	900	58	30 GAL BAGS OR EQUIVALENT	4 80	4 48	3 68	2 72	4 00	2 24
	900	59	30 GAL BAGS OR EQUIVALENT	1 26	2 34	1 98	2 52	2 16	1 98
	900	600	RECYCLE ALLEY SCALE TRASH	40 32	31 19	36 05	40 42	31 60	32 55
	900	600NP	NON PROFIT R/A SCALE TRASH FREE	0 60					
	900	600U	UNCOVERED RECYCLE ALLEY SCALE TRASH	4 04	4 69	5 05	2 27	7 04	4 12
	900	60F	FREE TRASH TO ROLLOFFS	8 85	6 60	7 20	4 95	5 55	6 75
	900	60H	TRASH @ 50% TO ROLLOFFS						
	900	9NC	NOT CERTIFIED OR ASSESSED	0 83	6 12	0 47	0 67		1 87
	900	9NCU	UNCOVERED NOT CERTIFIED OR ASSESSED						
			TOTAL TONNAGE	89	82	78	76	70	69

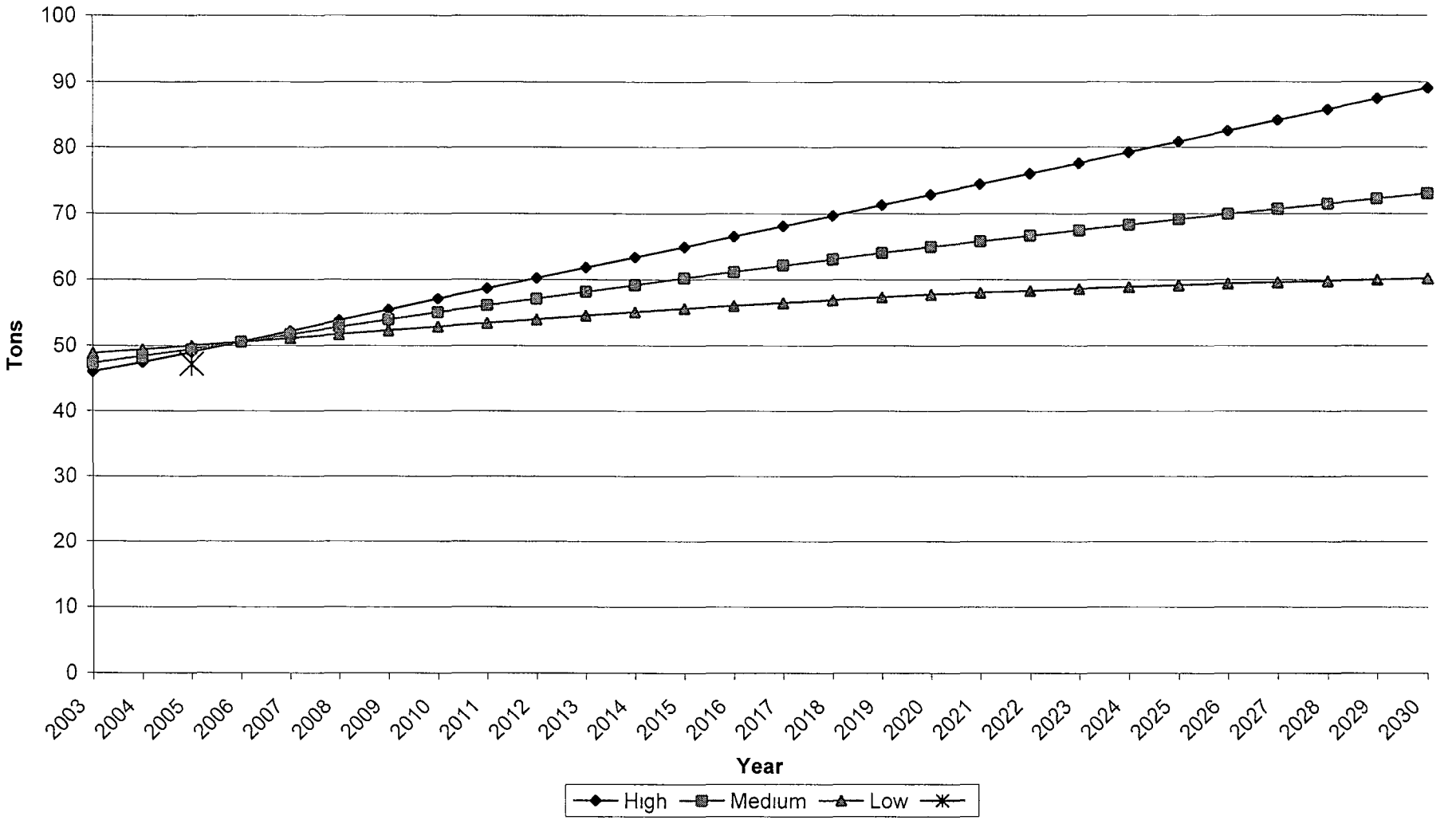
CALCULATIONS

AVERAGE DAILY TONNAGE TO LANDFILL =	275
PEAK DAILY TONNAGE TO LANDFILL =	400
PEAKING FACTOR =	1 5
AVERAGE DAILY TONNAGE TO CSA =	51
PEAK DAILY TONNAGE TO CSA =	77
PEAKING FACTOR =	1 5

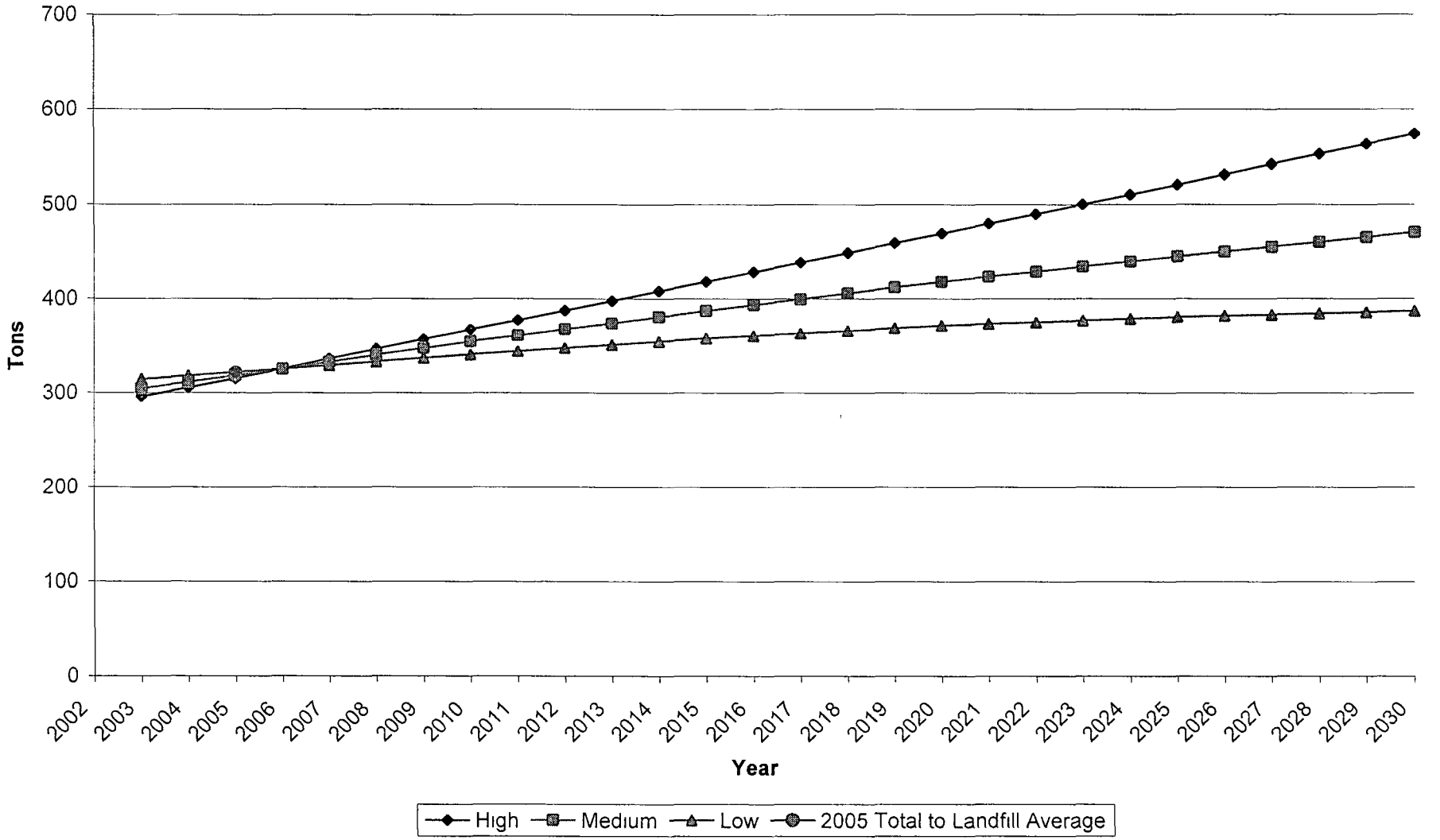
Citrus County Solid Waste Transfer Station and Site Improvements
GRAPH 1
Directly to Landfill Average Day Tonnage Projections



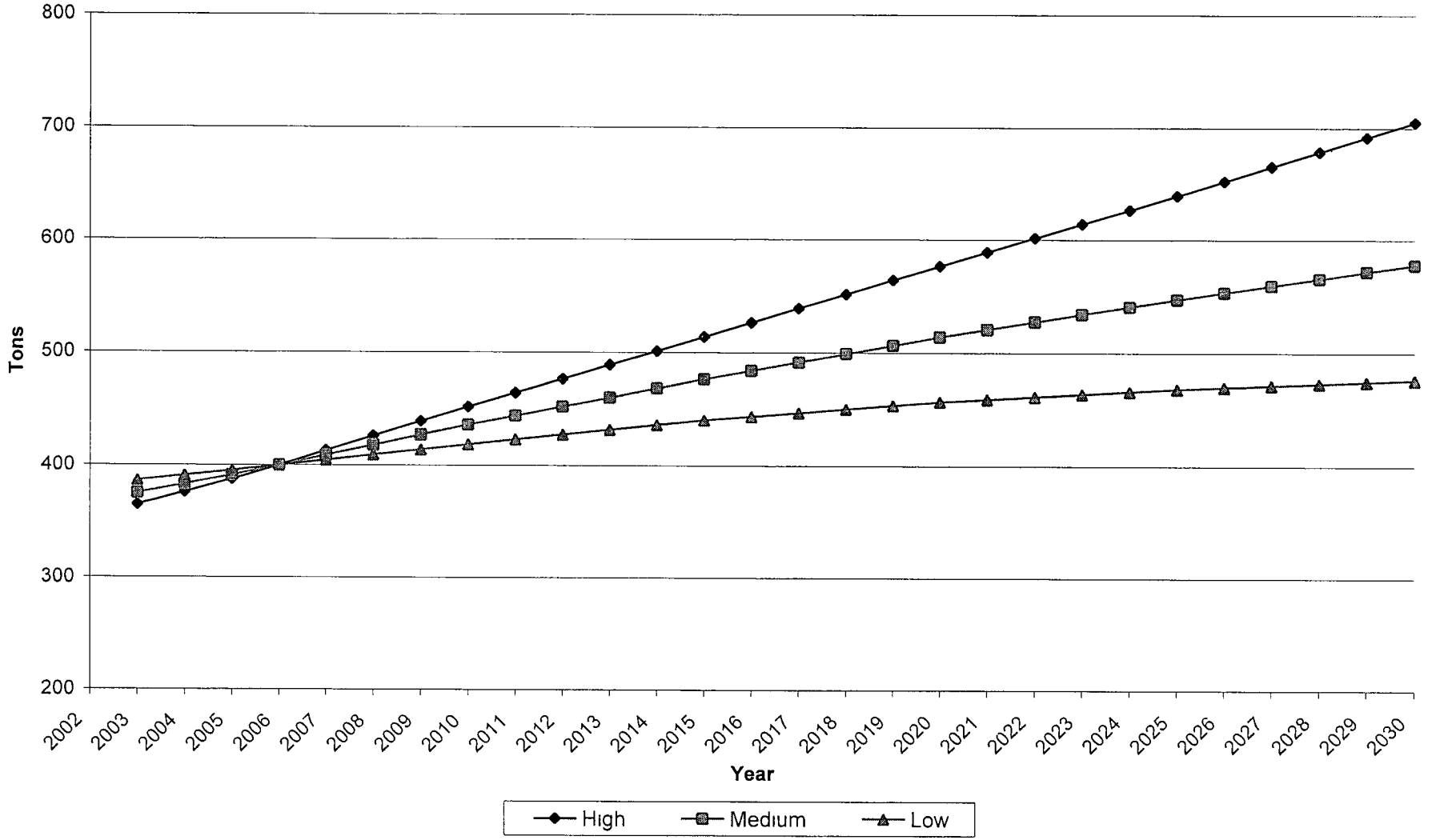
Citrus County Solid Waste Transfer Station and Site Improvements
GRAPH 2
CSA Average Day Tonnage Projections



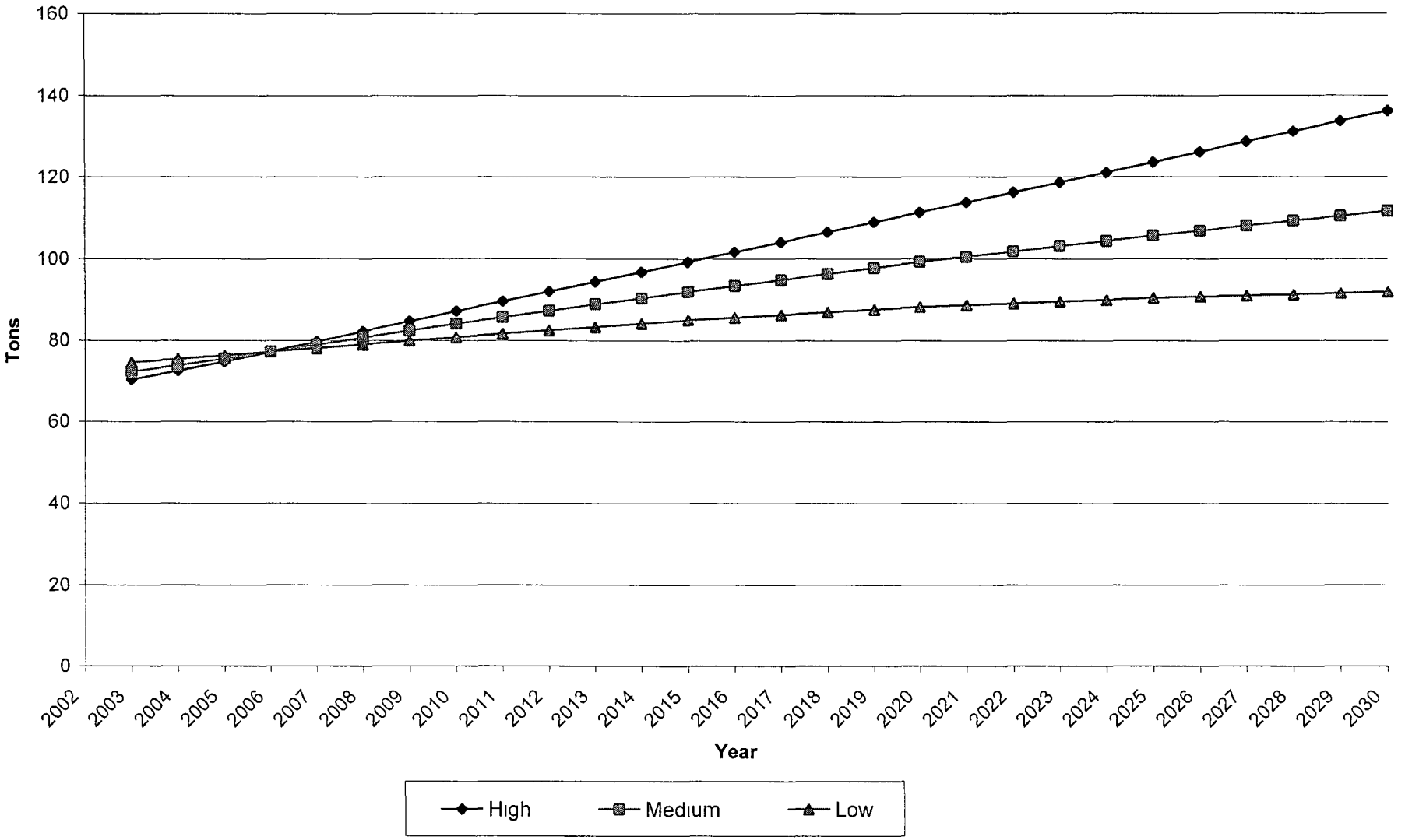
Citrus County Solid Waste Transfer Station and Site Improvements
GRAPH 3
Total to Landfill or Transfer Station Average Day Tonnage Projections



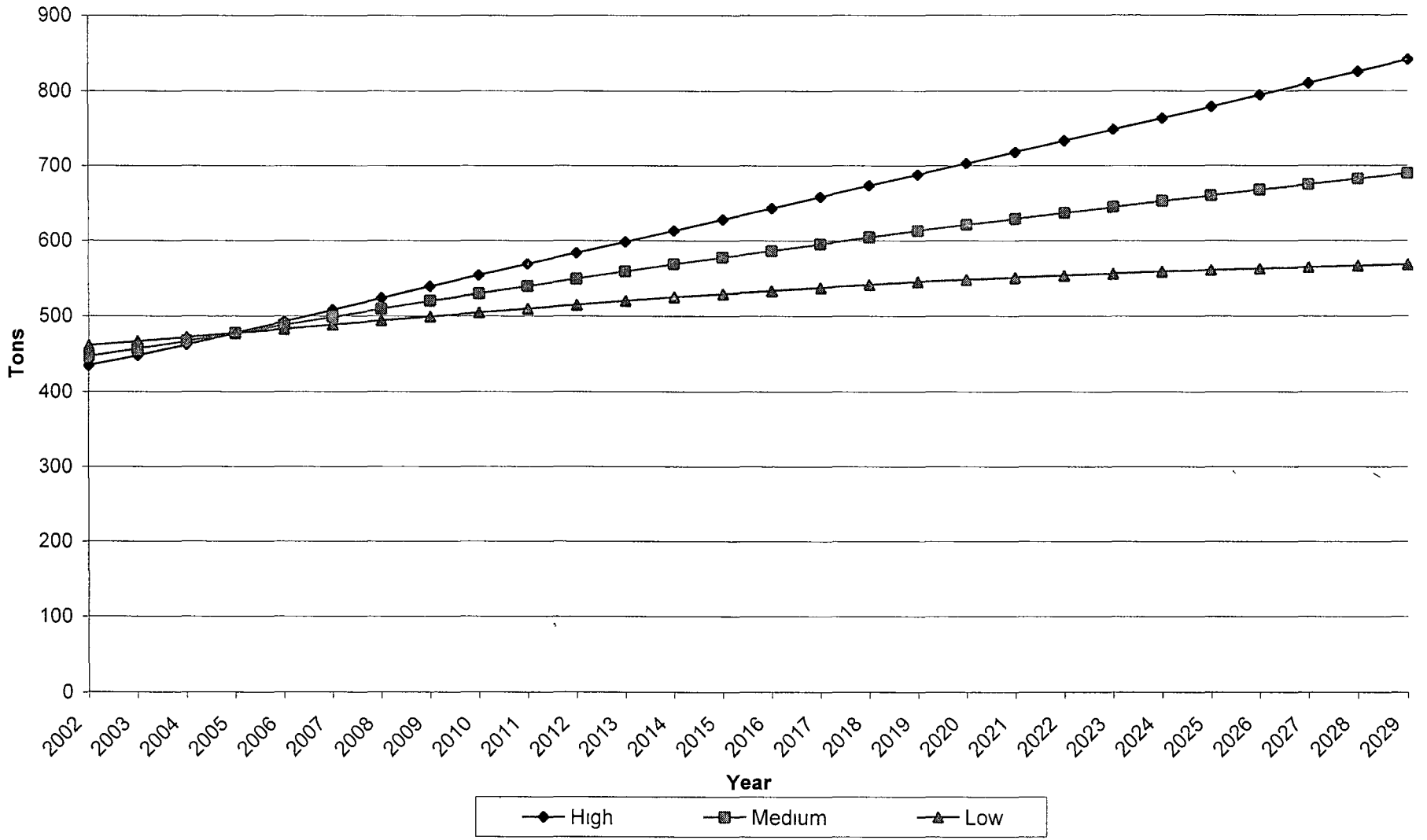
Citrus County Solid Waste Transfer Station and Site Improvements
GRAPH 4
Directly to Landfill Peak Daily Tonnage Projections



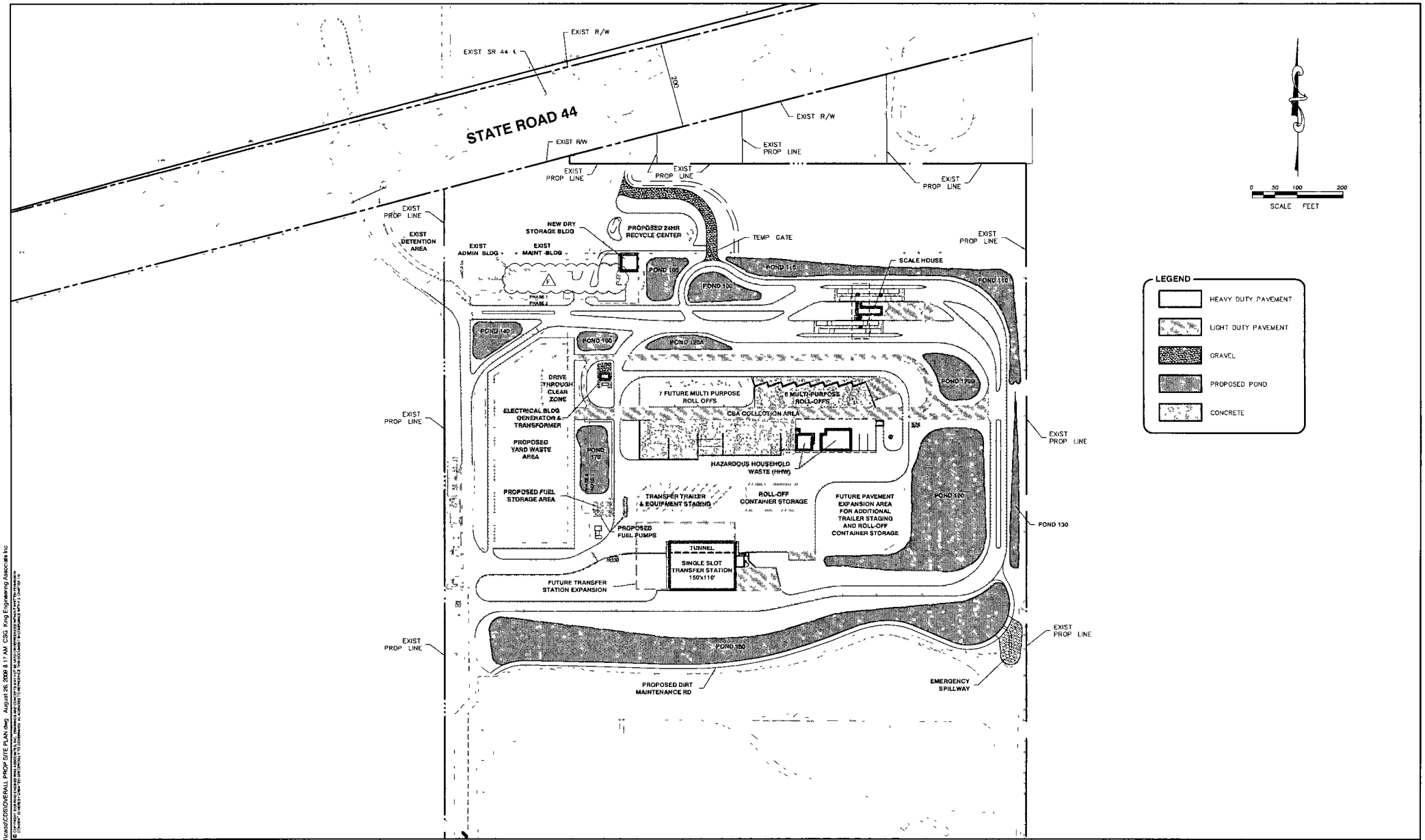
Citrus County Solid Waste Transfer Station and Site Improvements
GRAPH 5
CSA Peak Daily Tonnage Projections



Citrus County Solid Waste Transfer Station and Site Improvements
GRAPH 6
Total to Landfill or Transfer Station Peak Daily Tonnage Data Projections



Attachment C
Site Plan, Site Location Map and Well Location Map



O:\PW-Civil\4217\001\001\cadd\CDS\OVERALL PROP SITE PLAN.dwg August 26, 2009 8:17 AM CSG King Engineering Associates Inc

DESIGNED	RNC/KWL	THE SIGNATURE OF THE QUALITY CONTROL OFFICER IN THIS SPACE INDICATES THAT ALL REQUIRED PERMITS HAVE BEEN OBTAINED AND THAT CONSTRUCTION IS AUTHORIZED TO COMMENCE.	
DRAWN	NJS/KWL		
CHECKED	LGD		
Q.C.			

King ENGINEERING ASSOCIATES INC

4921 Memorial Highway
One Memorial Center Suite 300
Tampa Florida 33634
Phone 813 880-8881
Fax 813 880 8882
www.kingengineering.com
Engineering License #2610

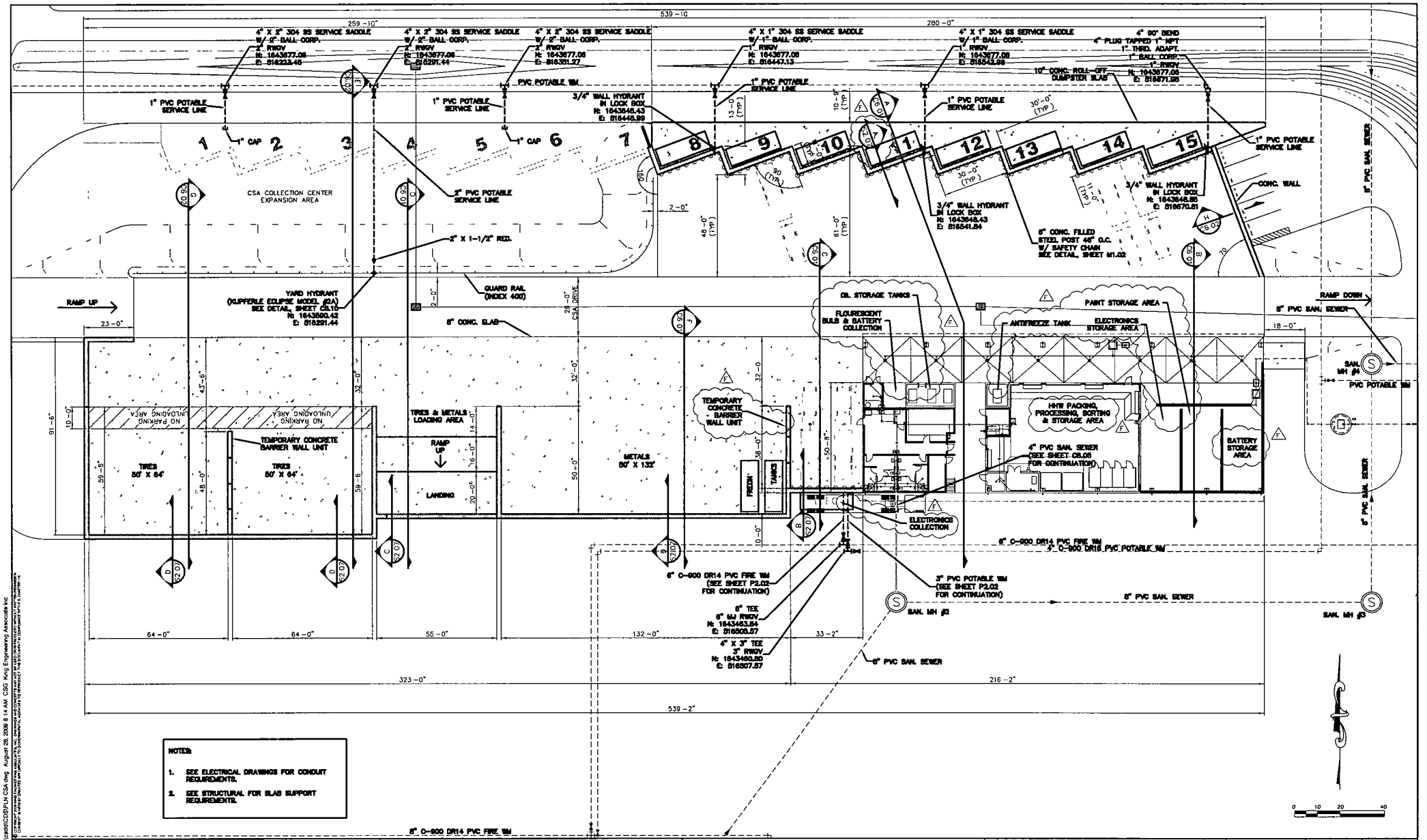
CITRUS COUNTY
SOLID WASTE TRANSFER STATION
& ASSOCIATED SITE IMPROVEMENTS
FOR
CITRUS COUNTY BOARD OF COUNTY COMMISSIONERS

OVERALL PROPOSED SITE PLAN

NO.	DATE	DESCRIPTION	APP'D BY
F	08/21/08	SOLID WASTE PAN #1	CPA/LGD
E	06/16/08	FRP 90 #1	CPA/LGD
D	06/13/08	FRP&A LEVEL DRAWINGS	CPA
C	04/13/08	FRP SUBMITTAL	CPA/LGD
B	11/19/08	90% SUBMITTAL	CPA/LGD
A	07/07/08	30% SUBMITTAL	CPA/LGD

LARA G B DALY P E
Aug 18 2009
FL P E No 61035
PROFESSIONAL SEAL

JOB NO 4217 001 001
DATE JULY 2008
SCALE AS SHOWN
SHEET NO C3.00



NOTES:

1. SEE ELECTRICAL DRAWINGS FOR CONDUIT REQUIREMENTS.
2. SEE STRUCTURAL FOR SLAB SUPPORT REQUIREMENTS.

DESIGNED	CS	THE SIGNATURE OF THE QUALITY CONTROL OFFICER IN THIS SPACE INDICATES THAT ALL REQUIRED PERMITS HAVE BEEN OBTAINED AND THAT CONSTRUCTION IS AUTHORIZED TO COMMENCE.	
DRAWN	CS		
CHECKED			
Q.C.			

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Engineering License #2610

CITRUS COUNTY
SOLID WASTE TRANSFER STATION
& ASSOCIATED SITE IMPROVEMENTS
FOR
CITRUS COUNTY BOARD OF COUNTY COMMISSIONERS

CSA
PLAN

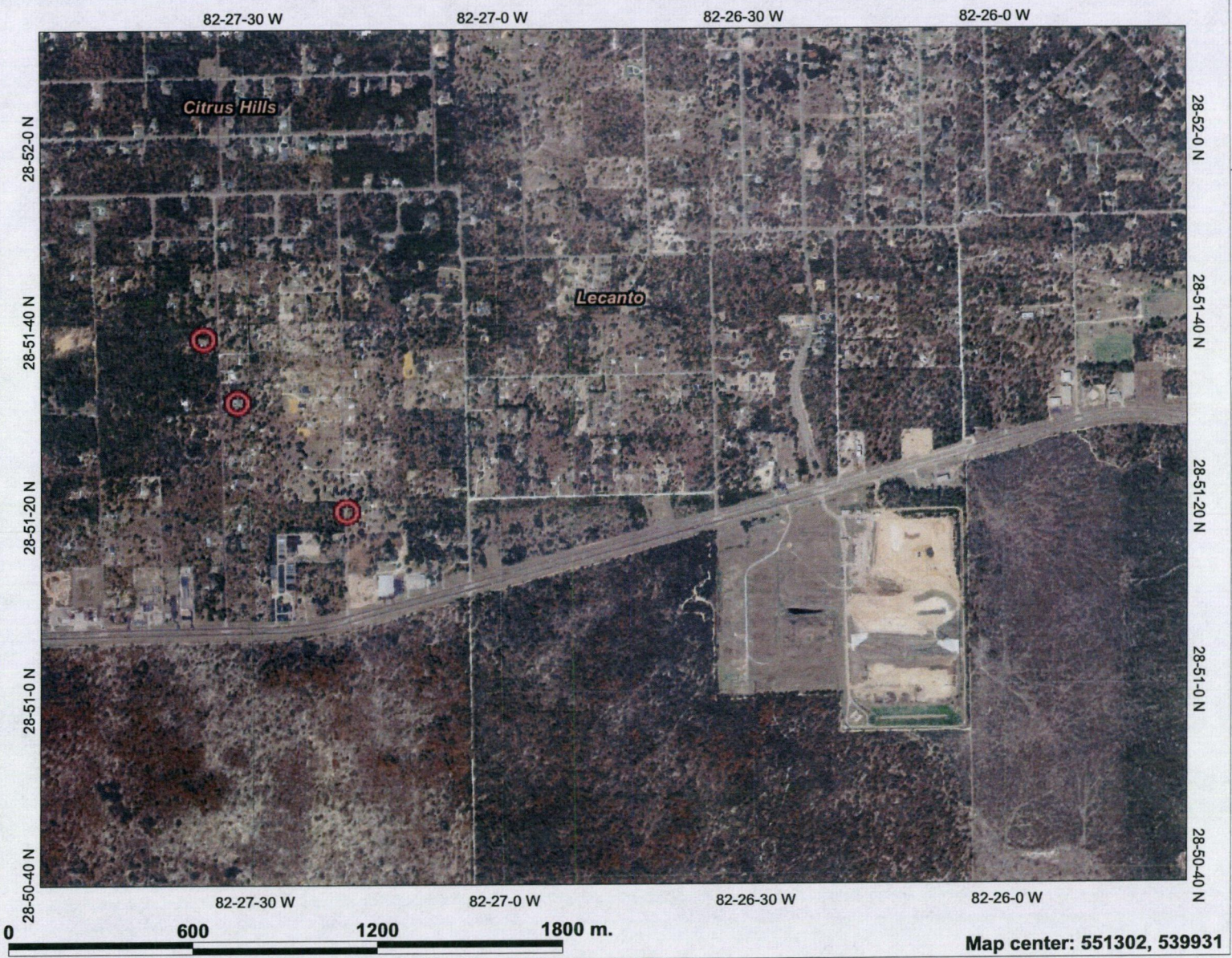
NO.	DATE	DESCRIPTION	APP'D BY
F	08/21/08	SOLID WASTE RAI #1 AND COUNTY COMMENTS	CPK/LDD
E	08/18/08	FRP RAI #1	CPK/LDD
D	08/15/08	FERMA LEVEL DRAWINGS	CPK
C	08/12/08	FRP SUBMITTAL	CPK/LDD
B	10/18/08	90% SUBMITTAL	CPK/LDD
A	07/07/08	30% SUBMITTAL	CPK/LDD

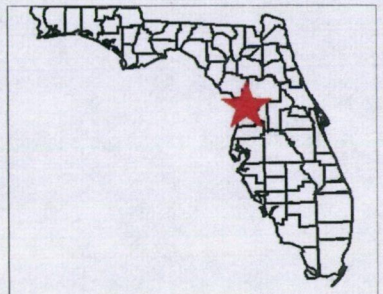
CHRISTOPHER F. KUZLER, P.E.
Aug 18 2009
FL P.E. No. 46532
PROFESSIONAL SEAL

JOB NO. 4217 001 001
DATE JULY 2008
SCALE AS SHOWN
SHEET NO. C6.00

O:\PW-Civil\4217\001\001\cadd\CDS\PLN CSA.dwg August 28, 2009 8:14 AM CSG King Engineering Associates Inc

Generalized Water Information System (GWIS)





Legend

- Wells - Background Wells
- Wells - HRS Private Wells
- Wells - VISA Wells
- EPA Permitted Dam Locations
- National Inventory of Dams (NID)
- WMD Districts (lines)
- DEP Districts (lines)
- Cities (census places)
- Military Bases
- Counties (generalized)

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
JUN 11 2009
SOUTHWEST DISTRICT
TAMPA

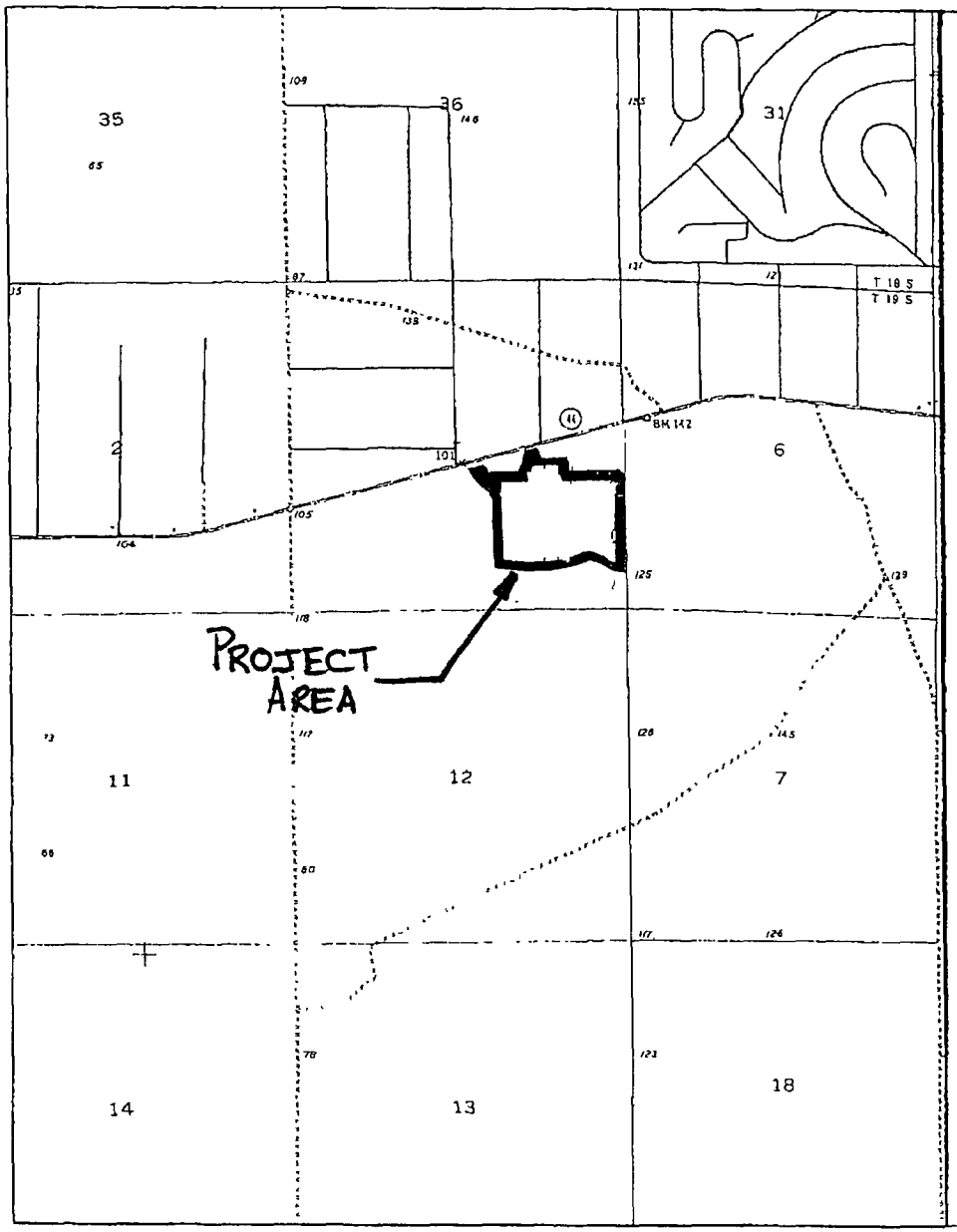
Map center: 551302, 539931

Scale: 1:20,000

[Florida Department of Environmental Protection] Disclaimer: This map is intended for display purposes only. It was created using data from different sources collected at different scales, with different levels of accuracy, and/or covering different periods of time.

Notes: Map produced on Thu Feb 26 17:33:42 EST 2009

Attachment D
FEMA Map



KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations*
100-Year Flood Boundary
500-Year Flood Boundary

ZONE B
ZONE D

Base Flood Elevation Line With Elevation In Feet** — 513
Base Flood Elevation in Feet Where Uniform Within Zone** — (EL 987)
Elevation Reference Mark — RM7×
Zone D Boundary
River Mile — •M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet, base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile, or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100 year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

APPROXIMATE SCALE
2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITRUS COUNTY, FLORIDA
(UNINCORPORATED AREAS)

PANEL 250 OF 400
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
120063 0250 B

EFFECTIVE DATE:
AUGUST 15, 1984

Federal Emergency Management Agency

Citrus County Fire Rescue

FIRE PREVENTION INSPECTION REPORT

3600 W. Sovereign Path, Suite 292, Lecanto, FL 34461 • Office (352) 527-5407 • Fax (352) 527-5523

Business Name:	Landfill Waste Tire Storage	Business Phone #:	527-7670
Physical Address:	230 W. Gulf to Lake Hwy	Building Permit #:	
Mailing Address:	City Limits: [ ] Y [✓] N	Plans Review #:	
City:	Lecanto Zip Code: 34461	Type of Construction:	II
Description:	Annual	Occupancy Class.:	Storage
Plaza [ ] Yes [✓] No:		Occupant Load:	
Unit #:	Station: 23	Tables & Chairs:	
Owner/Manager:		Chairs:	
Owner/Man. Phone #:		Square Footage:	

[ ] Initial [ ] Construction [✓] Request [ ] Complaint [✓] Re-inspection [ ] Other _____

CODE DEFICIENCIES:

County/City Occupational License: _____

STORAGE

[ ] Improper storage of combustible material
[ ] Storage too close to ceiling ok
[ ] Storage too close to electrical panel
[ ] Unsafe storage

EXIT DEFICIENCIES

[ ] Exits inadequate number or capacity
[ ] Aisles/corridors too narrow
[ ] Exit door does not swing in direction of travel
[ ] Door not equipped with approved exit hardware
[ ] Exit doors inoperative or locked ok
[ ] Exit blocked / obstructed
[ ] Emergency lights not provided or working
[ ] Exit sign(s) not illuminated
[ ] Exit sign(s) battery not operable

EXTINGUISHERS

[ ] Extinguishers not provided
[ ] Not proper type
[ ] Not inspected / tagged
[ ] Not visible / accessible Everyday
[ ] Inadequate number
[ ] Not charged / operable
[ ] Not properly installed

Date last inspected: May 2009

Number 1 Type ABC

Deficiencies noted below may cause a fire, contribute to the spread or cause undue injury to building occupants. Deficiencies must be corrected FORTHWITH. For additional information or assistance, please call: (352) 527-5407. BUILDING PERMITS ARE REQUIRED FOR ALL RENOVATION / REPAIRS.

SPRINKLERS/STANDPIPE

[ ] System not inspected / maintained
[ ] Valves closed
2/A [ ] Valves not accessible
[ ] Heads obstructed or too close to stock
[ ] FDC deficiency
[ ] Valve not secured / monitored

Date last inspected: _____

FIRE ALARM

[ ] Fire alarm not provided
2/A [ ] Fire alarm does not meet code
[ ] Fire alarm not inspected/maintained
[ ] Smoke detector not provided
[ ] Smoke detector inoperative

Date last inspected _____

ELECTRIC EQUIPMENT

[ ] Overloaded circuits
[ ] Electrical panel obstructed
2/A [ ] Electrical panel / boxes open
[ ] Coverplate missing
[ ] Temporary wiring / extension cords
[ ] Open junction box
[ ] AC / heating equipment not maintained

COOKING EQUIPMENT

[ ] Accumulation of grease in cooking equipment or duct
2/A [ ] Hood & duct system not in accordance with NFPA 96
[ ] Extinguisher system not in accordance with NFPA 17
[ ] Other cooking equipment deficiency

Date last inspected _____

REQUIREMENTS / COMMENTS:

No deficiencies noted during inspection.

Inspection Date/Time 5/8/09 10:30 Compliance Date: _____

Inspector: 144559 Gillen Occupant Signature: Susan J Metcalff

WHITE - office YELLOW - file PINK - recipient

Attachment F
Tipping Floor Maximum Storage Pile

Attachment G
Boundary Survey, Deed, and Topographic Survey

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND

QUITCLAIM DEED

No. 28007

THIS QUITCLAIM DEED, Made this 30th day of October, A.D. 19 87, between the BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND of the State of Florida, hereinafter call Grantor, and CITRUS COUNTY, a political subdivision of the State of Florida, c/o County Administrator, 110 North Apopka Avenue, Inverness, Florida 32560, hereinafter call Grantee,

WITNESSETH, that the Grantor, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable consideration to it in hand paid by the Grantee, the receipt of which is hereby acknowledged, has remised, released and quitclaimed unto the Grantee, their successors and assigns forever, all of the right, title, interest, claim and demand which the Grantor has in and to the following described land situate lying and being in Citrus County, Florida, to-wit:

A portion of Section 1, Township 19 South, Range 18 East, Citrus County, Florida Described as follows:

Commence at the Southwest corner of Lot 9, Block A, New Mayfield Acres, as recorded in Plat Book 2, page 42, public records of Citrus County, Florida, thence S 89 degrees 43'25" E on an Easterly projection of the South line of said Lot 9, Block A, a distance of 640.22 feet, thence S 0 degrees 16'35" W 20.00 feet to the Point of Beginning, said point being on the North line of the SE1/4 of said Section 1, thence continue S 0 degrees 16'35" W 2630.05 feet, thence S 89 degrees 43'25" E parallel to said North line a distance of 1325.00 feet, thence N 0 degrees 16'35" E 2630.05 feet to a point on said North line, thence N 89 degrees 43'25" W along the said North line, a distance of 1325.00 feet to the Point of Beginning. Containing 80 acres more or less.

TO HAVE AND TO HOLD the same, for the purpose of developing a landfill, together with all and singular the appurtenances thereunto belonging or in anywise appertaining, and all of the estate, right, title, interest and claim whatsoever of the Grantor, either in law or in equity, to the only proper use, benefit and behoof of the Grantee, its successors and assigns forever, subject to all outstanding easements, reservations, restrictions and other interests appearing of record.

PROVIDED, HOWEVER, that the Grantee will (1) comply with all state and local standards for landfills; and, (2) allow the State of Florida Department of Agriculture and Consumer Services, Division of Forestry to use the landfill free of charge.

This conveyance was accepted by the Board of County Commissioners at it's meeting held on 16 DECEMBER 1986

RETURN TO CITRUS TITLE CO. FILE 589.00

87 NOV 2 AM 11 59

516164

BOOK 759 PAGE 889

No. 28007

Title to the described lands will revert to the Grantor, at the option of the Grantor, to be reclaimed for forestry purposes at such time as the site has expended its capacity as a landfill, or at such time as the Grantor has determined that the described property is not being used as a landfill. Grantee shall have six (6) months from the date of notification to remedy any violation of the conditions of this conveyance.

IN TESTIMONY WHEREOF, the Trustees, for and on behalf of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida have hereunto subscribed their names and have caused the official seal of said Board of Trustees of the Internal Improvement Trust Fund of the State of Florida to be hereunto affixed, in the City of Tallahassee, Florida, on the day and year first above written.

Governor

Secretary of State

Attorney General

Comptroller

Treasurer

Commissioner of Education

Commissioner of Agriculture

As and Constituting the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida

Approved as to Form and Legality

BOOK 759 PAGE 890

Attachment H
Operation, Maintenance and Contingency Plan

~~APPENDIX H~~

CITRUS COUNTY
SOLID WASTE TRANSFER STATION
OPERATION, MAINTENANCE AND CONTINGENCY PLAN

Prepared for:

Citrus County Board of County Commissioners
P.O. Box 340
Lecanto, Florida 34460

Prepared by:

King Engineering
4921 Memorial Hwy.
Suite 300
Tampa, Florida 33634

June 2009
Revised August 2009

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SECTION 1

INTRODUCTION

The purpose of this document is to provide a manual of operating procedures for the Citrus County Transfer Station and Citizens Service Area (CSA).

This plan has been prepared in accordance with Florida Rule 62-701, Florida Administrative Code (F.A.C.) and -Part B of FDEP's permit application form for solid waste processing facility. ~~This document is an appendix to the existing Operations Plan for the landfill (21375-008-SO/01).~~

1.1 FACILITIES

The Citrus County Transfer Station is owned by the Citrus County Board of County Commissioners and operated by the Citrus County Solid Waste Management Division.~~Board of County Commissioners.~~ The transfer station is located on the northern 30 acres of the County's active landfill site. Other co-located facilities on this portion of the County's site include:

- A scale facility consisting of a scale house, two inbound scales and two out bound scales. The inside, outbound scale is reversible and can serve as a third inbound scale when necessary.
- The Customer Service Area (CSA) which serves as a municipal solid waste (MSW) disposal location for private residents and private haulers. The CSA consists of an elevated area and unloading platform with eight rolloff containers and bunkers for the delivery and storage of tires in accordance with the waste tire facility permit, electronics, used oil, fluorescent light bulbs, scrap metal and white goods.
- A Household Hazardous Waste Collection and Storage Facility (HHW) which is co-located with the CSA.
- A yard and wood waste processing facility adjacent to and west of the CSA.
- Ancillary facilities including an electrical building, standby generator, fuel storage and dispensing area, trailer staging and equipment storage areas.
- An administration building, maintenance building, dry storage building and multi-purpose tent.
- A recycling~~recycle~~ collection center; and
- A leachate treatment facility.

1.2 OPERATING CONDITIONS

The site plans shown on Figures 1-1 and 1-2 depict~~, depicts~~ the location of the on-site facilities.

The operating hours of the existing CSA and landfill are 8:00 a.m. to 4:30 p.m., Monday through Friday and 8:00 a.m. to 2:30 p.m. on Saturdays. The operating hours are posted at the entrances to the facility. The proposed Transfer Station will be operated during the same hours until the average amount of municipal waste processed each day is such that it warrants longer hours. The proposed recycling center is open 24 hours per day. The HHW is open for customer deliveries when staffing levels will support the safe handling of ~~same hours as~~ the material delivered. ~~CSA on weekdays and on one Saturday each quarter.~~ Citrus County staff have unlimited access to the HHW facility to deposit materials incidentally found during normal operations.

All vehicles destined for the landfill, transfer station, CSA, HHW or the yard waste facility enter the site via SR 44. All customers must head east and pass through the scale facility as they enter and exit the site. Customers are weighed and charged in accordance with the current fee schedules. From the scale facility, commercial haulers are directed to either the transfer station or the landfill. Residential customers are directed to the CSA, HHW or yard waste area. Depending on their load, residential customers and small scale commercial haulers may also be directed to the self-haul unloading area at the transfer station. This area consists of an overhead door in the southeast corner of the transfer station with an elevated bottom wall. Much like the walls at the CSA, customers using the self-haul unloading area at the transfer station are required to back in against the ±2.5-foot high wall at the overhead door, exit the vehicle, and deposit ~~throw~~ their trash over the wall and onto the tipping floor.

Transfer trailers enter the site from the main entrance at SR 44 and head south along the western boundary of the site and then east to the transfer building. In the tunnel, the open-top trailers are loaded from above and a knuckleboom crane compresses and grooms the load. A scale~~scales~~ is located in the tunnel to monitor the load in the trailers. The weight of the load is displayed on ~~a screen located on~~ the tipping floor as well as in an area visible to the trailer driver. After being loaded, the trailers exit the transfer building and head west to the western boundary of the property and then north where they exit the site either through the main entrance or through the secondary entrance at the 24-hour recycling center.

The Recycle Center customers will enter the site from a separate entrance on SR-44, drop off the material at one of the six recycling bins and exit the facility in a counter-clockwise manner. Customers exiting the scale facility also have the option of turning north to visit the Recycling Center and then exiting the site from the secondary entrance.

Currently, no sorting of municipal waste occurs at this facility, or is proposed in the future transfer station building, other than that required to remove prohibited items discovered in the waste.

1.3 FACILITY EQUIPMENT

The County presently has equipment on site for management of their landfill, CSA and Yard Waste facilities. This equipment~~Equipment~~ includes:

- Pickup trucks (2) for general maintenance and transport

- Utility vehicles (2) for transport
- Dump trucks (2)
- ~~Water truck~~
- (2) Front end loaders with large 4-way bucket, broom, grapple and fork attachments ~~for management of CSA materials~~
- Forklift
- Tractor with small bucket
- Rolloff truck for transporting roll-offs at the CSA to the landfill
- 20-yard and 30-yard rolloff boxes (10) for use at the CSA
- Bulldozer, Caterpillar D6
- Compactor, Caterpillar 826 G
- Compactor, Caterpillar 826 H
- Self-Loading Scraper (Pan), Caterpillar 623F, 23 Yard
- Fuel Truck, Ford F350 – with 400 gallon diesel fuel tank and air compressor
- Water Truck, Ford 700, w/2000 gallon water tank & 100 g.p.m. pump (18 H.P. B&S)
- (2) Lite Sets, Alamand, with 6kw generator ~~(located in disposal cell and in CSA)~~
- Dump Trailer, 6' x 12', Hydraulic
- Grabber Attachment for 55 Gal. Drums, for the Fork Lift
- Generator, 150 kW Caterpillar (Olympian), Trailer mounted,
- Water Transfer Pump, 4" outlet, Mack, Hydraulic drive
- Water Transfer Pump, 4" outlet, Acme
- Hand Tools and Mechanics Tools, at both the Maintenance Building and HHW.
- Various mowers and lawn maintenance equipment

The new scale facility will consist of a scale house, two inbound scales and two out bound scales. The inside, outbound scale is reversible and can serve as a third inbound scale when necessary. Each aboveground, flat top scale is at least 60~~70~~-feet long with a capacity of 200,000 lbs. The transfer station is operated using open top type technology utilizing a knuckleboom crane positioned over the loading pit that will be operated from a control booth adjacent to the pit. The number of transfer trucks needed will depend on factors such as pay-load and trip distance and will be the responsibility of the sub-contractor. The County will obtain two front-end loaders buckets, each will be ~~with a~~ 4.25 cubic yard capacity general purpose bucket with a rubber edge. The front-end loaders will be used to manage stored material on the waste tipping floor and to push waste into the loading pit. Other equipment the County plans on procuring includes a skid steer with broom and blade attachments and ~~,~~a Yard truck which may be owned or leased depending on contract ~~and if composting yard waste , a scarab or similar may be purchased~~. Equipment for screening and mulching will be contracted.

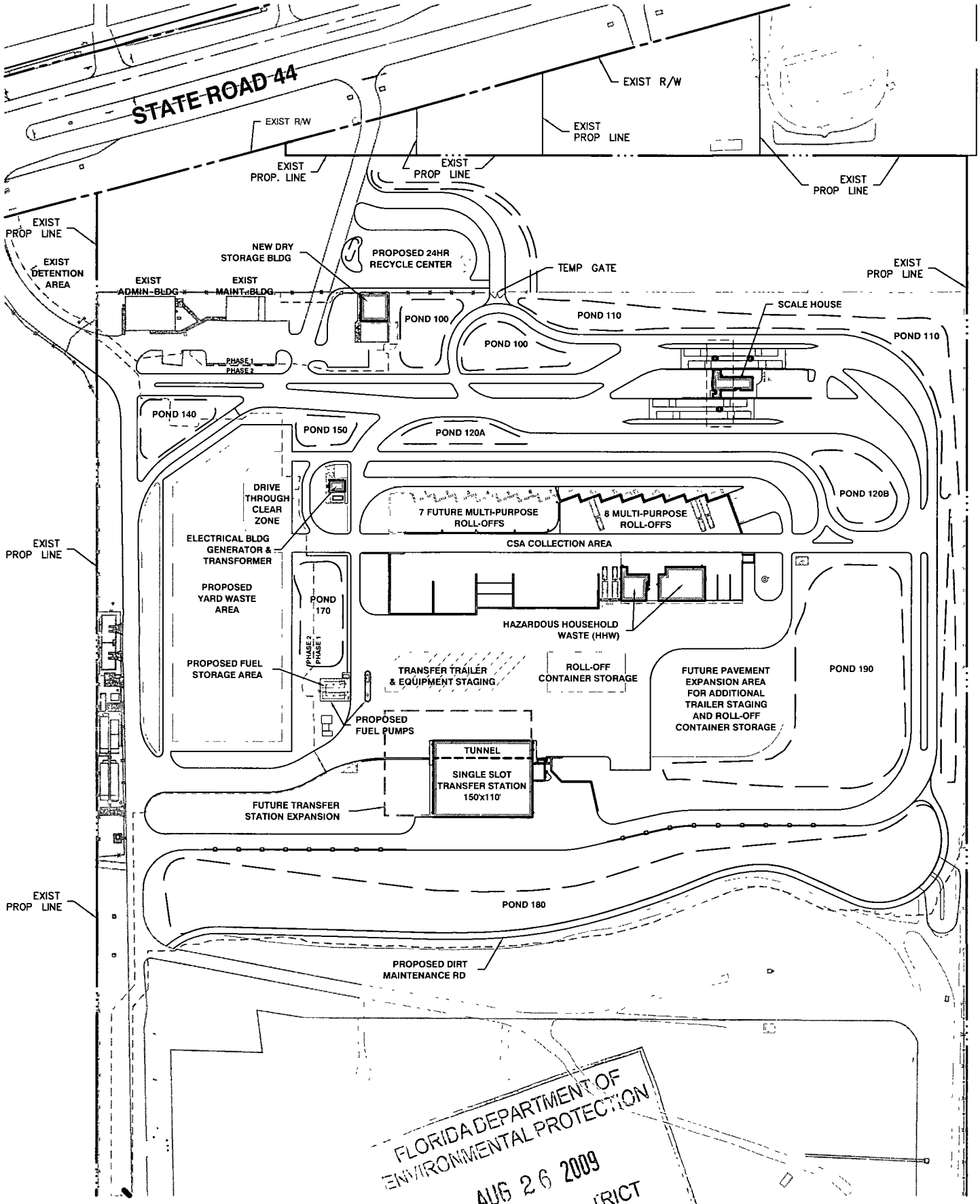

FIGURE 1-1

CITRUS COUNTY SOLID WASTE MANAGEMENT FACILITY SITE PLAN

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
AUG 26 2009
SOUTHWEST DISTRICT
TAMPA

JOB NO	4217-001-001
DATE	06/09/09
SCALE	1 =200'
DRAWN BY	RNC

PREPARED BY

King
ENGINEERING ASSOCIATES INC
4921 Memorial Highway
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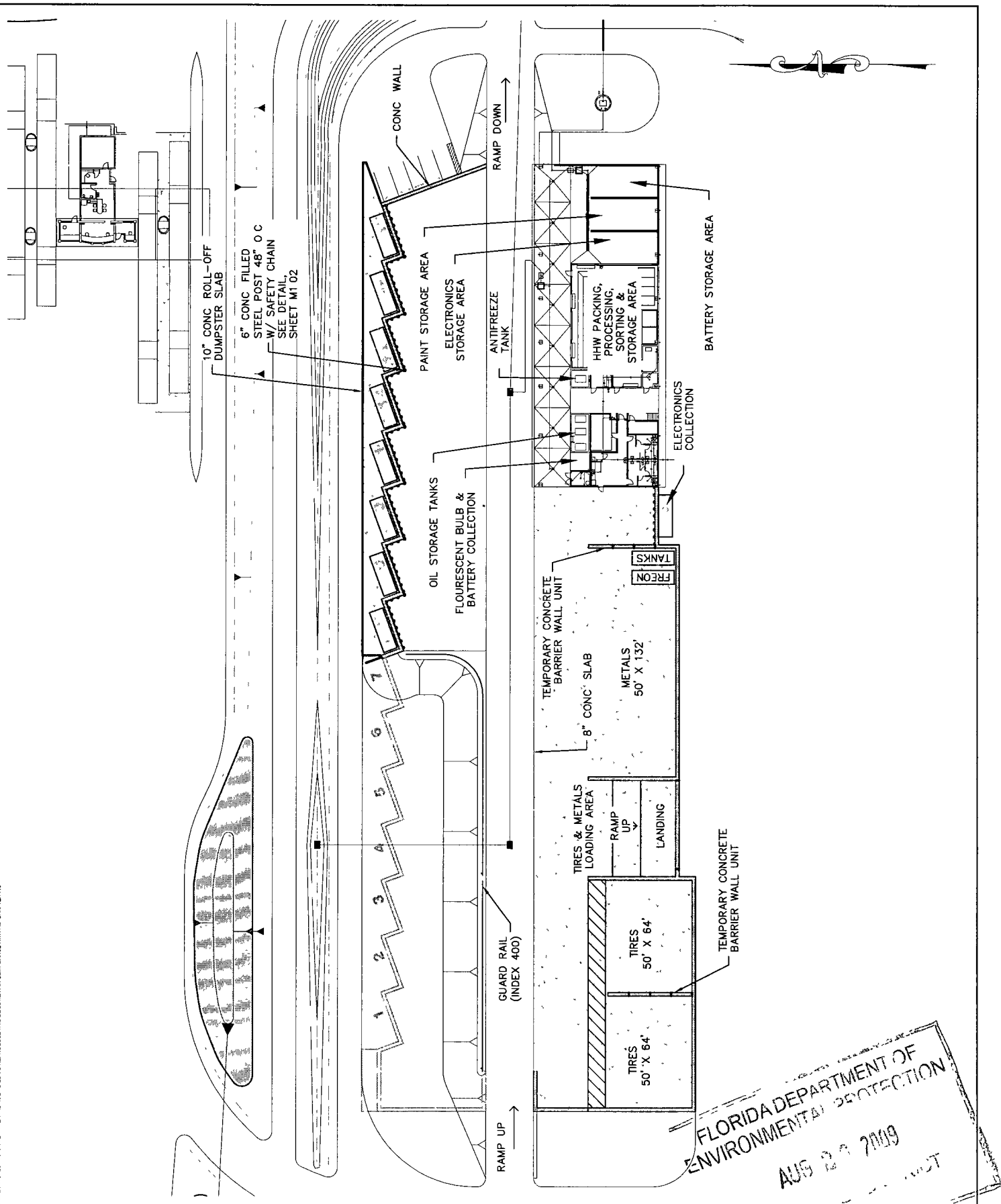
O:\PW-Civil\4217\001\001\cadd\CONCEPT\PLN-PSP-8X11 dwg , August 25, 2009 5 03 PM, CSG, King Engineering Associate Inc



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FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
AUG 2 7 2009

FIGURE 1-2

CITRUS COUNTY SOLID WASTE CSA & HHW SITE PLAN

JOB NO	4217-001-001
DATE	06/09/09
SCALE	1 =75
DRAWN BY	RNC

PREPARED BY
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SECTION 2

OPERATIONS AND MAINTENANCE
(RULE 62-701.710 (4), F.A.C.)

2.1 TRAINING AND CERTIFICATION OF OPERATORS AND SPOTTERS
(Rule 62-701.710(4)(c) F.A.C.)

In accordance with the referenced rule, at least one trained waste processing facility operator will be on duty whenever the facility is operating. In addition, at least one trained spotter will be present at the transfer station when waste is received to ensure that prohibited materials are removed from the waste stream and to direct traffic on the tipping floor.

Operators are certified in accordance to all FDEP requirements including, but not limited to, the regulatory aspects of transfer station operations, such as leachate and storm water management, ventilation and odor control, waste control, operating guidelines, employee health and safety and contingency planning.

Hiring Plan

Open positions are advertised by Citrus County Human Resources Office. The best qualified eligible individuals are interviewed by the supervisor of the open position. SomeMany positions (all equipment operators) also require a skills test. OpenMany open positions may beare interviewed by two persons in the organization.

All staff that are in public information positions, scalehouse, CSA, transfer stationTS or landfillLF waste screening positions will be required to become certified spotters within 6 months of hiring and maintain the certifications with FDEP-approved continuing educations classes. We concentrate on selecting safety-related classes for official continuing education credits.

Formal safety training for all field positions happens at least once a month led by internal staff. Office staff has safety training at least once per quarter. Printed class outlines and attendance lists are available for review. Informal safety training happens whenever an employee takes on a new task. Counseling happens after every injury or damage incident.

Operator and spotter training will comply with Rule 62-701.320(15), F.A.C., as adopted May 27, 2001. Operators at the Transfer Station shall participate in at least 16 hours of initial training and pass an examination as required for waste processing facilities. Every three years waste processing facility operators shall participate in continuing education courses totaling 8 hours. All Operator training will consist of courses conducted by the University of Florida TREEO Center, or other courses presented by other providers that have been approved by the Florida

Solid Waste Management Training Committee (SWMTC).

In accordance with Rule 62-701.320(15), F.A.C., spotters shall participate in 8 hours of initial training that shall include Spotting at Construction and Demolition Sites, Landfills, and Transfer Stations (SWMTC 8 hours) and/or Waste Screening and Identification for Landfill Operators and Spotters (SWMTC 8 hours) conducted by the University of Florida TREEO Center or other SWMTC approved providers. Every three years spotters shall participate in continuing education courses totaling four hours.~~Training for operators and spotters will comply with Section 2.1 of the Landfill Operations Plan.~~

2.2 DESIGNATION OF PERSONS RESPONSIBLE FOR OPERATION AND MAINTENANCE (Rule 62-701.710 (4)(a)(1), F.A.C.)

The persons directly responsible for major components of the facility are as outlined in the table below~~Section 2.2 of the Landfill Operations Plan~~.

Component	Responsible Party
Operations	Field Crew Leader or Customer Service Crew Leader
Repair and Maintenance	Solid Waste Management Division Director
Permitting Requirements	Solid Waste Management Division Director
Water Quality and Leachate Testing	Solid Waste Management Division Director

The landfill Field Operations Crew Leader or Customer Service Supervisor has overall responsibility for the operation of ~~both~~ the landfill and the transfer station and shall be a certified Waste Processing Facility Operator and Landfill operator. The landfill Field Crew Leader or Customer Service Supervisor is responsible for the day-to- day implementation of the operations plan and, along with the Solid Waste Management Division Director, is responsible for environmentally safe operations in accordance with state and federal regulations.~~.~~

2.3 CONTINGENCY OPERATIONS FOR EMERGENCIES (Rule 62-701.710(4)(a)(3), F.A.C.)

The contingency plan for the facility addresses the following potential emergencies:

- Equipment failure
- Unusual operating conditions resulting from poor weather conditions
- Accidents
- Fire

2.3.1 Emergency Incidents Plan

A site specific Emergency Incidents Plan is included in Appendix A ~~of the Landfill Operations Plan~~. The operating standards for the HHW and its ~~emergency plan can be found in the County's existing~~ Emergency Incidents Plan can be found in Appendix B.

2.3.2 Equipment Failure

~~Equipment failure is addressed in Section 2.3.2 of the Landfill Operations Plan.~~ In the event of failure of the knuckleboom crane in the transfer station, waste will either be loaded into trailers without compaction or the transfer station will be taken out of service and all waste will be directed to the landfill. A standby generator is available to serve the entire transfer station portion of the site and the leachate treatment facility. An additional standby generator serves the leachate holding facility at the south end of the landfill.

Sufficient back-up equipment will be provided on site for equipment breakdowns and for downtime because of normal routine equipment maintenance. In the case of a major equipment failure, the following procedures will be followed:

- Maintain duplicate equipment capability
- Contact contractors and rental equipment dealers as pre-arranged, to furnish equipment on short-term notice (within 24 hours)

In the event of equipment failure, the Field Crew Leader will contact the Landfill Maintenance Coordinator. Within 24 hours of notification of the Landfill Maintenance Coordinator, the equipment will be replaced with back-up capability if necessary, or repaired and placed back in operating condition.

All equipment maintenance will either be performed by Citrus County or will be contracted by Citrus County to a maintenance contractor.

Redundant pumping systems are provided for the leachate system.

2.3.3 Poor Weather Conditions and Natural Disasters

Unusual operating conditions could result from excessive rainfall and electrical storms. The type and volume of materials to be disposed of after a hurricane or excessive storms will change normal transfer station operations~~Poor weather conditions and natural disasters are addressed in Section 2.3.3 of the Landfill Operations Plan.~~ During extremely high wind conditions or electrical storms, operations will be temporarily suspended to protect the workers and the public. Disposal operations will be suspended immediately before and during a hurricane or tornado.

Access to all areas of the site, including the top slope of the landfill, is provided by paved roads, all of which drain into the site stormwater system. These roads should remain accessible during typical rainy weather.

2.3.4 Fire

Emergency procedures for fires are described in section H., 1. of the Emergency Incidents Plan

included in Appendix A.
~~If a fire is discovered by one of the transfer station spotters, they will first use their portable radio to contact supervision and inform them of the issue. Then the operator will evacuate any customers or staff that are in the effected area and, if possible move any equipment that might be damaged.~~

~~On-site personnel are aware of the location of all fire extinguishers, fire hoses, and emergency equipment. Then and only if trained and if they elect to, they may attempt to extinguish the flame with the fire suppression equipment by hand until the fire department arrives. If the operator is not trained and/or the fire is too large the building fire suppression system will be activated and the fire department will be automatically notified. The scale house operator will also close the facility to the public and vehicles will be asked to abandon the facility. If the fire occurs when the station is unoccupied then the buildings fire suppression system will automatically activate and alarm the fire department.~~

~~Hot waste loads arriving at the facility will not be allowed to dispose of waste in the transfer station building. The scalehouse attendant or tipping floor spotter will request the driver to route the load to the active landfill area and follow the procedures implemented for the active landfill outlined in Section 2.3.4 of the Landfill Operations Plan.~~

2.3.5 Agencies to be notified

Agencies to be notified are outlined in section B. of the Emergency Incidents Plan included in Appendix A.
~~In the event of an emergency such as fire, large spills, sudden release of contaminated materials, or explosion, the following shall be notified immediately, if applicable:~~

~~IMMEDIATE EMERGENCY~~	~~9-1-1~~
~~Citrus County Fire Rescue~~	~~(352) 527-5406~~
~~Citrus County Sheriffs Department~~	~~(352) 726-4488~~
~~Electric (Progress Energy)~~	~~(800) 452-2777~~
~~Water (Citrus County Utilities Department)~~	~~(352) 527-7650~~
~~Florida Department of Environmental Protection (FDEP)~~	~~(813) 632-7600~~

2.4 CONTROL/INSPECTION OF INCOMING WASTE
(Rule 62-701.710(3)(c)(2), F.A.C.)

All solid waste arriving at the facility is routed through the scalehouse. Scalehouse attendants screen visible loads for unacceptable materials including recyclables, hazardous waste, and medical waste. All commercial haulers arriving at the site are weighed at the scale house and directed to the transfer station or to the landfill. In general, residents with less than nine bags of MSW or yard waste, or residents with flat rate items such as tires, propane tanks, electronics, batteries and fluorescent light bulbs, check in at the scale house and are not weighed. Residents and private haulers with more than nine bags of MSW or yard waste are weighed in and out at

the scale house as are residents and private haulers with large loads that dispose of their waste on the transfer station tipping floor.

The scale house attendant directs customers to the proper location for disposal. Customers delivering MSW, tires, propane tanks, electronics, batteries and fluorescent light bulbs are directed to the CSA. Household hazardous~~Hazardous~~ wastes are ~~temporarily~~ received when staffing levels will support the sale handling of the material delivered and stored in the HHW ~~3 days per week, and one Saturday per quarter~~. Customers delivering yard waste are directed to the yard waste facility. A spotter is located at the Citizen's Service Area, at the Transfer Station and at the landfill working face to observe the types of waste actually deposited.

If prohibited wastes are discovered by the scalehouse attendant or one of the facility spotters, the vehicle will be directed back to the administration office. If the waste has not yet been unloaded, the person responsible for shipping the waste will be notified and the vehicle driver will be directed to leave the site. If the waste has been deposited, the area of the waste load should be blocked from public access until the generator or hauler of the waste cleans up the waste. If the generator or hauler of the waste cannot be identified or is unable to remove the waste, Citrus County will be responsible for cleanup, transportation, and disposal of the waste at an appropriate waste management facility. In all cases, the FDEP should be notified~~Prohibited and special wastes are handled in accordance with Section 2.4 of the Landfill Operations Plan~~.

The following wastes shall not be accepted at the facility:

- Wastes containing polychlorinated biphenyl (PCBs).
- Biomedical wastes.
- Containers or tanks twenty gallons or larger in capacity.
- Hazardous/CESQG wastes except for those accepted at the HHW and included in the current permit.

Special waste shall be collected at the CSA or HHW and managed as follows:

- Used oil and antifreeze is placed at the HHW facility and collected by a contractor.
- Lawn debris and yard waste is placed within the registered yard waste processing facility for management.
- Tires are placed into the permitted used tire facility for management.
- Appliances/White Goods - all freon containing appliances shall have the freon removed by County personnel and then placed within the scrap metal recycling container which is collected in accordance to permit requirements ~~daily~~ by a contractor.

- Scrap Metal - all scrap metal shall be placed within the scrap metal bunker until collected in accordance to permit requirements ~~daily~~ by a contractor.

- Electronics – all electronics shall be placed within the Electronics Recycling storage area and collected by a recycling contractor.

- Lead acid batteries are placed on pallets and collected by a recycling contractor in accordance to permit requirements.

- Mercury-containing devices, or spent mercury-containing lamps, shall be placed in containers and stored until removed for proper disposal by a designated contractor.

- Used propane tanks shall be stored in the appropriate container until collected by a recycling contractor

2.5 VEHICLE TRAFFIC CONTROL AND UNLOADING

(Rule 62-701.500(2)(e), F.A.C.)

All vehicles enter the site via the main entrance on SR 44. After entering the site, all haulers and residents head east to the scale facility. After exiting the scale facility, all vehicles turn south. CSA, HHW and yard waste customers then turn west while commercial haulers and other vehicles destined for the transfer station or landfill continue south and then west up the tipping floor approach road. Vehicles will then back into the transfer station from the south or up to the self-haul unloading area from the east, or will continue west to the landfill access road. Vehicles leaving the landfill or the transfer station will follow this same route in reverse.

After turning west off the main road, CSA, HHW and yard waste customers take the CSA loop road west. Yard waste customers continue west into the yard waste ~~west~~ facility. CSA and HHW customers turn south before the yard waste facility and then east onto the CSA/HHW center aisle. Traffic from these facilities continues east, back to the main road, and then north and west to the scale facility and the site exit. Residents have the option of turning north after the scale facility to enter the 24-hour recycling center and exit to SR 44.

Transfer trailers enter the site from the main entrance at SR 44 and head south along the western boundary of the property and then east into the staging area. Transfer trailers travel through the transfer station tunnels in a clock-wise direction. After being loaded and weighed in the tunnels, the trailers will continue west to the road on the western boundary of the property and then north to the main exit or the recycling center exit.

Loaded scrap metal, electronics, tires, and hazardous waste trailers will exit onto the main road on the east side of the CSA, cross the outbound scales and then exit the site through the main exit.

2.5.1 Transfer Station

Signs are strategically located throughout the site, warning vehicles of speed limits and potential hazards. Haulers are instructed not to drive on the waste tipping floor until directed by the operating staff. Attendants and vehicle spotters verbally give instructions as required and maintain traffic on the tipping floor.

~~.~~Self haulers at the self~~slef~~-haul unloading area are also directed to remain in their vehicle until they are advised when it is safe to back up to ~~the~~ the unloading area. This area consists of an overhead door in the southeast corner of the transfer station with an elevated bottom wall. Much like the walls at the CSA, customers using the self-haul unloading area at the transfer station are required to back in against the ±2.5-foot high wall at the overhead door, exit the ~~and step out of their~~ vehicle, and deposit ~~throw~~ their trash over the wall and onto the tipping floor. ~~to unload.~~ Children are instructed to remain in the vehicle. ~~In addition, signs are strategically located throughout the site, warning citizens of speed limits and potential hazards. The spotter on duty maintains traffic on the tipping floor.~~

2.5.2 Citizen Service Area

The CSA has a full time attendant assigned for all hours of operation who also acts as a spotter. A laborer is also assigned to the area to facilitate litter control and any other task that arises during operation hours. If necessary, the attendant will direct the patron to specific roll-off containers or storage bin. Patrons are required to empty their own vehicles into the roll-off containers and bins, and then may leave the site.

2.5.3 Yard Waste Facility

Customers delivering yard waste proceed to the yard waste facility receiving~~YWF tipping~~ area, and are directed by onsite personnel and traffic cones to the proper location to unload. Upon removal of yard waste from delivery vehicles, the customers then proceed through the CSA and then back to the County scale house to be weighed out and ~~to~~ complete their transaction (if needed) or they may exit the site directly if their transaction is completed.

Customers loading mulch are directed to either the hand or machine load area of the yard waste facility by onsite personnel. After loading the mulch, the customers proceed through the CSA and then back through the scale facility to leave the site. These vehicles are not weighed out.

2.5.4 Recycling Collection Center

The Recycle Center customers will enter the site from a separate entrance on SR 44, or after passing through the outbound scales. After dropping off the material at one of the recycling bins, they exit the recycling collection center directly onto SR-44. Vehicles from the recycling center are not allowed to enter the site from this entrance.

2.6 METHOD AND SEQUENCING OF PROCESSING WASTES
(Rule 62-701.710(4)(b), F.A.C)

2.6.1 Transfer Station

Depending upon the time of delivery, material is stockpiled on the tipping floor until a transfer vehicle is available to be loaded, at which time the waste is pushed into the loading bay in a sequential motion with the closest pile being less than 24 hours on the tipping floor. Using a front-end loader, large, bulky items are broken into smaller pieces. The waste is pushed through the pit located at the north end of the building and into the open top transfer trailer below. The waste is distributed and compacted within the trailer using the knuckleboom crane. The weight of the tractor trailer combination is displayed in the crane operator's control booth and on indicators mounted on the wall of the tipping floor. Waste continues to be loaded until the tractor trailer combination reaches a maximum weight of 80,000 pounds or until the trailer is full, whichever occurs first. Once loaded, the tractor trailer exits the tunnel to the west, closes its cover, and leaves the site. If absolutely necessary, waste not stored on the tipping floor or transported off-site will be stored in transfer trailers either covered with a tarp or parked in the transfer station, within an area served by the leachate collection system, until the next business day.

2.6.2 CSA

Empty rolloff bins are placed in the CSA prior to the open of business each day. When full, a rolloff is loaded onto a rolloff truck and then brought to either the transfer station or the landfill to be emptied. The empty rolloff position at the CSA is coned off by the CSA spotter until an empty rolloff is placed in the available slot. At a minimum, all rolloff containers are emptied at the end of each business day, or if circumstances do not permit the rolloff to be emptied, stored within the confines of the leachate collection system until the next business day. After being emptied, the rolloff container is either returned to the CSA or it is staged in the paved rolloff storage area on the south side of the CSA.

One day per week, or as necessary, full rolloff containers are weighed at the inbound scales before being brought to the landfill or the transfer station. This information is used to estimate the total tonnage of each type of waste received at the CSA for that week.

Prior to impending rain events, the CSA spotter evaluates the nature and volume of the waste in the rolloff containers. Rolloffs near capacity, or rolloffs containing unbagged MSW are removed and replaced with empty containers. At all times, staff shall monitor potential sources of leachate and, through on-going maintenance procedures, shall minimize the leakage of leachate from containers. All reasonable efforts shall be made to contain and remove noticeable leachate spills.

2.7 LEACHATE COLLECTION SYSTEM (Rule 62-701.710(3)(b), F.A.C.)

The transfer station has a leachate collection system to collect leachate on the tipping floor and

the tunnels and convey the leachate to the leachate pump station which then pumps it to the existing landfill leachate pump station. Roofing over the tipping floor and tunnel, along with grading of roadway surfaces outside the transfer station eliminate the mixing of leachate with storm water. Leachate generated within the transfer station flows into the leachate collection system trench drain on the tipping floor and floor drains in the tunnels. For ease in cleaning, the trench drains are equipped with removable grates wide enough to accommodate a shovel. Leachate trench drains in the transfer station are cleaned as required or, as a minimum, at the end of each business day.

An HDPE gravity collection system conveys the leachate from the trench drains to the proposed leachate pump station. A 4-inch leachate force main conveys leachate from the pump station to the existing landfill pump station for conveyance to either the leachate holding tanks or the leachate treatment system. The operation of the transfer station leachate pump station is as follows:

- Upon wet well sump level rise, the Pressure Transducer sensors will sense the rising leachate levels and upon the set pressure (second level) being reached, will start the lead pump. With the lead pump operating, the wet well level shall lower to the Pressure Transducer pressure turnoff setting and the pump shall stop. Alternating relay shall index on the stopping of the pump, so that the lag pump will start on the next operation. If the level continues to rise when the lead pump is operating, the pressure setting within the Pressure Transducer (third level) will start the lag pump and activate the visual alarm light. Both the lead and lag pump shall operate together until the pressure setting within the Transducer turns off both pumps. ~~Leachate trench drains in the transfer station are cleaned as required or, as a minimum, at the end of each business day.~~

- If the level of the wet well should continue to rise when both pumps are operating, the high level non-mercury switch (fourth level) shall be energized and the audible alarm shall be activated. If one (1) pump shall fail for any reason, the second pump shall operate on the override control (third level pressure setting), and the flashing visual alarm light shall activate. If the level shall then rise past the fourth level control, the audible alarm shall be activated. The high level non-mercury switch shall be adjustable, for level setting, from the surface.

The leachate collection system for the remaining system is operated and maintained, and leachate monitoring and reporting is conducted in accordance with Section 9~~7~~ of the Landfill Operations Plan.

2.8 ODOR AND VECTOR CONTROL (Rule 62-701.710(4)(d), F.A.C.)

Odor control for the CSA consists of removal of all waste to the landfill or transfer station prior to closing daily, plus cleaning of temporary storage areas as needed.

In the transfer station, waste is processed on a first-in, first out basis. Stored municipal solid

waste does not remain on the floor for more than 24 hours except under unusual circumstance under which wastes may be stored for up to seven days. The following methods are used to minimize off-site odors:

- The tipping floor is cleaned as needed to control odors.
- The loading areas, sumps and drains, and compaction equipment are cleaned regularly.
- Wastes are managed inside the Transfer Building and containers.
- Loaded wastes are removed from the site frequently.
- The Facility Manager, or his/her designee, screens incoming loads for odor problems. Loads that have begun to degrade and may soon emit objectionable odors are given loading priority so that they can be quickly placed in trucks and transferred from the facility.

Areas where waste is stored or processed are cleaned at least weekly to prevent odor or vector problems, and all drains and leachate conveyances are kept clean so that leachate flow is not impeded.

In addition to proper management practices, the transfer station uses air exchange as a means of controlling dust and odor. Sixteen exhaust fans on the tipping floor walls and four exhaust fans in the tunnel provide the capability of up to 12 air exchanges per hour, which should mitigate the potential for nuisance odors at the facility.

Should off-site odors become problematic, the Operations Crew Leader will investigate, determine the source of the problem, and institute corrective actions as appropriate. Additional odor control methods may be implemented, as needed. The facility will be operated to control objectionable odors in accordance with FAC 62-296.320(2).

2.9 FIRE PROTECTION (Rule 62-701.710(4)(e), F.A.C.)

The site has dual potable water systems consisting of a domestic water system and a fire system. The fire system consists of a series of 8-inch water mains with fire hydrants placed no further than 400-feet from any building. In addition, the transfer station building and the office area of the HHW were constructed with automatic fire sprinkler systems. A fire and potable water booster pump station provide pressure to meet fire flow requirements. The processing area of the HHW is equipped with an automatic foam fire protection system.

Fire extinguishers are present in each building and in the cab of all heavy machinery, control rooms, and electrical rooms.

The Transfer Station spotters must be constantly alert for possible fires either from a load that is delivered or from a malfunction in the transfer station systems.

Staff shall immediately contact 911 if a fire is observed. Then, and only if trained and if they elect to, they may attempt to extinguish the flame with the fire suppression equipment at hand until the fire department arrives.

2.10 CLEANING AND SHUTDOWN PROCEDURES
(Rule 62-701.710(4)(e), F.A.C.)

At the end of the day, ~~the~~ staff ensure the following procedures are completed:

- All rolloff containers at the CSA are emptied, or stored on the tipping floor of the transfer station or inside the leachate collection area of the landfill.
- All truck doors on the tipping floor level are closed and secured, this will also include the overhead door in self-haul drop off area on the east side of the tipping floor.
- Sweeping up and litter control around the scalehouse, transfer station and CSA~~CCC~~;
- Cleaning out of leachate grates.
- A complete walk around of all equipment. Damage or issues that might have accrued are noted on the operator's inspection sheet for that machine.
- The tunnel area is inspected for any damage or issues that might impact the operation of the transfer station and its overhead doors are closed and secured.
- A check of the transfer station is completed to make sure that no unauthorized persons are present.
- All lights are turned off in the tipping floor and tunnel area.
- The restroom area is inspected for any damage or issues that might have occurred during the day.
- No waste is accepted in the transfer station while it is closed.

SECTION 3

OPERATING RECORDS
(RULE 62-701.710(9)(A), F.A.C.)

The operating record will consist of all records, reports, analytical results, and all notifications as required by Rule 62-701, F.A.C. These records are considered an integral part of the operations plan and will be kept at or near the facility for a period of 3 years. The operating records will be available for inspection at reasonable times upon request by FDEP personnel.

The Citrus County Solid Waste Management Division Director will be responsible for the storage and filing of all operational records. The minimum records to be kept as part of the official operating record include the following:

- A copy of the approved permit;
- The approved Operations Plan;
- Operating records and inspection forms as required by this Operations Plan;
- Record Drawings;
- Daily log of quantity of solid waste received, processed, stored, and removed from the facility for recycling or disposal and the county of origin of the waste (if known);
- Monthly records shall include type of solid waste, recovered materials, residuals, and unacceptable waste which is processed, recycled and disposed;
- A log of the facility operator's daily inspections and any subsequent corrective actions;
- Records of the origin or deliverer of waste received;
- Training certificates.

~~Operation records are maintained and reported as outlined in Section 3 of the Landfill Operations Plan.~~

SECTION 4

WASTE RECORDS
(RULE 62-701.710(9)(A), F.A.C.)

Each month, a report of the amount of waste received, in tons, will be compiled. The report will also include estimates of the amounts of the following waste types:

- Household waste;
- Commercial waste;
- Construction and demolition debris;
- Yard trash;
- Waste tires;
- Materials collected at the HHW;
- Recyclables.

Reports~~records~~ are compiled monthly and maintained and are made available to FDEP on request~~reported as outlined in Section 4 of the Landfill Operations Plan~~.

SECTION 5

ACCESS CONTROL
(RULE 62-701.710(4)(F), F.A.C.)

The entire Citrus County Transfer Station facility and adjacent landfill is fenced, and access is gate controlled at all times. Figure 1-1 is a site plan of the entire transfer station and CSA access control facilities. The transfer station, CSA and associated facilities operate and accept waste Monday through Saturday, as follows:

Monday - Friday: 8:00 a.m. to 4:30 p.m.

Holidays and Saturday: 8:00 a.m. to 2:30 p.m.

During Holiday periods, the operating hours may be adjusted.
~~Access Control is as outlined in Section 5 of the Landfill Operations Plan.~~

SECTION 6

WASTE MONITORING
(RULE 62-701.500(6), F.A.C.)

6.1 WASTE INSPECTION (Rule 62-701.500(6)(a), F.A.C.)

Citrus County has implemented a load checking program to detect and discourage attempts to dispose of unauthorized wastes at the transfer station and landfill. This program includes at least three random checks by personnel each week and ~~Waste~~ inspection of suspicious loads, which are vehicles that have previously been determined to have delivered unauthorized waste, or loads that have unusually physical characteristics.

If any regulated hazardous wastes are identified during load checking the waste will be immediately placed ~~is~~ in the household hazardous waste collection and storage facility for sorting and storage. Following is a summary of the load inspection program. The complete load inspection plan is kept on file in the Citrus County Landfill office.

1. Personnel will direct a minimum of three (3) vehicles per week to a separate area on the tipping floor.

2. The driver of the vehicle will be asked the source of the waste by the inspector. The load will be completely unloaded and spread uniformly so that all waste is visible.

3. The inspector will proceed to inspect the load for unauthorized waste. These shall include, but are not limited to the following:

   - Restricted materials (tires, yard waste, etc)
   - Lead-acid batteries
   - Regulated hazardous waste
   - Biomedical waste
   - Containers of liquids
   - Compressed gas cylinders
   - PCB wastes (Transformers)
   - Large quantity of household type hazardous waste (Indication of business source)

4. If any restricted items are observed, the waste will be relocated by the County to the designated unauthorized waste holding area. If a commercial hauler, the collection company will be contacted to send a representative to verify the contents of the load~~accordance~~ with the inspector and the ~~Section 6.1 of the Landfill~~ Operations Crew Leader or his or her designee. The payment for disposal of the waste will be the sole responsibility of the person responsible for delivering the waste to the county waste management facility.

5. The person responsible for shipping the waste will provide a manifest documenting the proper disposal of the unauthorized waste found during inspection. The manifest must indicate the corresponding identification number assigned to the waste during inspection.

6. If any regulated hazardous waste or biomedical waste is observed, the Operations Crew Leader or his or her designee will implement the Solid Waste Management Operations Emergency Response Plan for the Identification of Regulated Hazardous Waste. This plan includes notifying FDEP, persons responsible for shipping the wastes, and the generator of the wastes. ~~.~~

7. Transfer station personnel will relocate all special wastes such as tires, appliances, lead acid batteries, and lawn debris to the proper disposal or storage areas. A separate invoice will be issued to the persons responsible for shipping the waste and made part of the inspection report. See Section 2.4 for procedures for handling special wastes.

8. If any large quantities of household hazardous waste are identified, it will be relocated to the household hazardous waste storage facility.

9. Copies of all completed inspection reports will be forwarded to the Administrative Office for the Division of Solid Waste Management, the persons responsible for shipping the waste, and the Citrus County Special Operations Section. These records will be maintained for three years.

10. Vehicles that have previously been determined to have delivered unauthorized waste will be considered suspicious and may be subject to inspection at any time and in the same manner as the random inspections.

6.2 HAZARDOUS WASTES AND HANDLING PROCEDURES

(Rule 62-701.500(6)(b), F.A.C.)

Hazardous waste identified during the load checking program will temporarily be stored in the household hazardous waste collection and storage facility, and all handling procedures must follow the Household Hazardous Waste Operations Plan, which is on file in the landfill office.

Items in the transfer station (TS) that are identified to be unauthorized will be given back to the driver that delivered them. If the driver does not accept the material the transfer station spotter will note the truck information and fill out a load inspection sheet for the unauthorized material. The County will also notify the FDEP of the driver's refusal to accept the unauthorized material. The material left in the transfer station will then be moved to a temporary holding area away from material being processed. The location of the holding area will be designated on a daily basis depending on the day's operations and will be cleared out daily of material staged there. If the material discovered is not authorized to be handled at the Citrus County Central Landfill or Hazardous Household Waste Area, then appropriate arrangements will be made to properly handle the material. If material discovered in the transfer station is hazardous the transfer station

spotters will use their portable radio to contact supervision and inform them of the issue. Once notified, supervision or the transfer station operator on duty will take appropriate actions to mitigate the issue. The steps may include, but are not limited to, evacuating the transfer station or calling Citrus County Fire and Rescue or 911.

SECTION 7

STORMWATER MANAGEMENT SYSTEM AND MAINTENANCE (Rule 62-701.500(10), F.A.C.)

7.1 STORMWATER BEST MANAGEMENT PRACTICES

The transfer station and associated facilities use the following stormwater best management practices (BMPs):

- Sideswales
- Grass
- Sod
- Dry retention stormwater ponds

Plans and cross sections of these systems are on file with the FDEP Southwest District office as part of the site's Environmental Resource Permit (ERP) application package.

In accordance with rule 62-701.710(1)(e)2., the contents of the rolloff containers in the CSA shall be monitored and evaluated on a continuous basis to determine if their contents could generate a significant amount of leachate in the event of inclement weather. If so, these containers are to be removed and emptied. Incidental leachate that may be found on the ground shall be cleaned up.

7.2 STORMWATER MAINTENANCE PROCEDURES

Stormwater management system operation and maintenance shall be in accordance with Stormwater Management~~Section 9 of the Landfill~~ Operations & Maintenance Manual dated July 2009 which was approved with~~Plan and~~ the transfer station/CSA Environmental Resource Permit (ERP). The Stormwater Management System will be operated and maintained as necessary to meet the requirements of Rule 62-701.400(9), F.A.C.

SECTION 8

EQUIPMENT AND OPERATION FEATURES (RULE 62-701-.710 (4)(A), F.A.C.)

8.1 EQUIPMENT (Rule 62-701.500(11)(a), F.A.C.)

The new transfer station will be operated using open top type technology utilizing a knuckleboom crane positioned over the loading pit that will be operated from a control booth over the slot. The crane will be used to level and compact material that is loaded into the open top transfer trailers. Citrus County will contract the hauling of the municipal waste from the transfer station to the landfill. The number of transfer trucks needed will depend on factors such as pay-load and trip distance and will be the responsibility of the contractor. The County will obtain additional buckets for its front-end loaders as required to work in the transfer station, landfill or CSA. Normal maintenance will be performed on site. Major maintenance item repairs (e.g., engine, transmissions, auxiliary drives) will be handled either at the maintenance facilities or at off-site service facilities.

8.2 BACKUP EQUIPMENT (Rule 62-701.500(11)(b), F.A.C.)

In the event of an unscheduled shutdown of the transfer station, the doors to the tipping floor will be closed and the scale house will notified to divert trucks delivering waste to the Landfill area. If the Solid Waste Management Division Director did not initiate the shutdown, the transfer station spotter will notify he or she or their designee of the issue causing the shutdown. If the shutdown impacts the tunnel area those doors shall also be shut. In the event the shutdown was due to an emergency, the FDEP will be notified within 24 hours. As needed other resources will be called to assist with re-opening the transfer station.

8.3 COMMUNICATION EQUIPMENT (Rule 62-701.500(11)(c), F.A.C.)

Transfer station employees will be able to communicate by two-way radios, and a telephone is located at the scalehouse and administrative office.

8.4 FIRE PROTECTION AND FIRE FIGHTING CAPABILITIES (Rule 62-701.500(11)(e), F.A.C.)

The site has dual potable water systems consisting of a domestic water system and a fire system The fire system consists of a series of 8-inch water mains with fire hydrants placed no further than 400-feet from any building. In addition, the new transfer station building and the HHW have automatic fire sprinkler systems. Fire and potable water booster pump stations provide pressure to meet fire flow requirements.

Additional emergency response equipment readily available on-site is listed in Section C of the Transfer Station Emergency Incidents Plan.

8.5 SIGNS (Rule 62-701.500 (11)(g), F.A.C.)

Appropriate signs will be utilized and maintained to ensure maximum safety, efficiency, and general information. Signage will include, at a minimum, facility name and operating authority, traffic flow, hours of operation, disposal rates, and restrictions or conditions of disposal.

~~Equipment and Operation Features are in accordance with Section 10 of the Landfill Operations Plan.~~

SECTION 9

LEACHATE MANAGEMENT
(RULE 62-701.500(8), F.A.C.)

Leachate is collected by trench drains on the transfer station tipping floor and tunnel and conveyed by 6-inch High Density Polyethylene (HDPE) pipes to a manhole located to the west of the transfer station tunnel. Roofing over the tipping floor and tunnel, along with grading of roadway surfaces outside the transfer station, eliminate the mixing of leachate with storm water. The trench drains are equipped with removable grates wide enough to accommodate a shovel. Cleanouts within the building combined with the manhole allow access for inspection and cleaning of the leachate lines.

An 8-inch gravity line conveys the leachate from the manhole to the transfer station leachate pump station located at the north toe-of-slope of the hill to the west of the transfer station. Two submersible pumps in the pump station convey the leachate from the wet well into a 4-inch force main that runs to a meter assembly adjacent to the landfill master leachate pump station. After being metered, leachate from the transfer station is discharged into the landfill leachate pump station wet well. Facility personnel will record transfer station leachate flows daily. This will allow the transfer station leachate flows to be separated from the landfill leachate flows. Leachate generation/flow records will be kept at the facility as part of the official operation record.

The landfill leachate pump station conveys the combined leachate from the transfer station, the Phase 1 and 2 landfill and the closed 7-acre landfill to the leachate storage tanks located at the southwest corner of the landfill site or to the on-site leachate treatment facility. Leachate from the landfills is monitored, sampled and analyzed in accordance with Section 9 of the Landfill Operating Plan. There are no FDEP requirements to sample or monitor the leachate from the transfer station, although the Division Director may choose to implement some level of sampling and analyses for operations purposes.

9.1 OPERATION AND MAINTENANCE OF LEACHATE COLLECTION SYSTEM
(Rule 62-701 .500(8)(b), F.A.C.)

The Utility Operator is responsible for maintenance of the leachate systems, including the site piping and pump station. The pump station equipment manufacturer will provide operation and maintenance manuals for the system components. Maintenance of each component will be performed in accordance with manufacturer specifications and documented on a Leachate Collection System Inspection Report, included in Attachment E. Operation and maintenance manuals include the following:

- Description of unit and component parts, including normal operating characteristics and limiting conditions.
- Operating procedures.

- Maintenance and overhaul procedures.
- Installation instructions.
- Original manufacturer's parts list, illustrations, and detailed assembly drawings
- Spare parts ordering instructions.
- Manufacturer's printed operating and maintenance instructions.

Daily maintenance on each the pump station will also include reading flow meters and making sure each pump is operational. Pumping rates and electrical draw will be confirmed semiannually. If these tests indicate significantly reduced performance, the pumps will be pulled for inspection and repair. A replacement pump will be installed while the repairs are being made. Proper operation of the pump station is as follows:

1. Upon pump station wet well sump level rise, the Pressure Transducer sensors will sense the rising leachate levels and upon the set pressure (second level) being reached, will start the lead pump. With the lead pump operating, the wet well level shall lower to the Pressure Transducer pressure turnoff setting and the pump shall stop. Alternating relay shall index on the stopping of the pump, so that the lag pump will start on the next operation. If the level continues to rise when the lead pump is operating, the pressure setting within the Pressure Transducer (third level) will start the lag pump and activate the visual alarm light. Both the lead and lag pump shall operate together until the pressure setting within the Transducer turns off both pumps.

2. If the level of the wet well should continue to rise when both pumps are operating, the high level non-mercury switch (fourth level) shall be energized and the audible alarm shall be activated. If one (1) pump shall fail for any reason, the second pump shall operate on the override control (third level pressure setting), and the flashing visual alarm light shall activate. If the level shall then rise past the fourth level control, the audible alarm shall be activated. The high level non-mercury switch shall be adjustable, for level setting, from the surface.

If leachate backs up into the transfer station trench drains, the leachate collection system will be inspected. Possible reasons for back up are pump station malfunction or trench drain or drain line blockage. If pipe blockage is identified, the pipe will be power jetted using the available cleanouts or the leachate manhole to remove the blockage.

9.2 LEACHATE HANDLING (IF REGULATED AS HAZARDOUS WASTE)

(Rule 62-701 .500(8)(b), F.A.C.)

If, in the future, the leachate becomes classified as a hazardous waste, it will be managed in accordance with Rule 62-730, F.A.C., or other rules as may be applicable at the time.

9.3 OFF-SITE TREATMENT (Rule 62-701.500(8)(c), F.A.C.)

Leachate is normally treated and disposed of on site. If off site treatment and disposal is necessary, leachate will be transported to one of several Citrus County Utilities wastewater treatment plants. No written agreement exists with Citrus County Utilities because it is a division of this department.

9.4 ON-SITE TREATMENT (Rule 62-701.500(8)(d), F.A.C.)

Leachate will be treated onsite. A powdered activated carbon enhanced, activated sludge plant treats all leachate generated at the landfill and at the transfer station. This plant, manufactured by ZIMPRO, provides sequential batch treatment in two stages. There are two first stage reactors and one-second stage reactor. The first stage is aerobic for nitrification of the ammonia in the leachate, and the second is an anoxic treatment process for denitrification. The second stage is supplemented with methanol to support the microorganisms due to low influent nutrients. Carbon provides removal of metals, complex organics and serves as microbial attachment medium. Mobile dissolved ions are not removed. After filtration and chlorination, the effluent is ready for on-site disposal. Sludge from the treatment process is dewatered and disposed in the landfill. The Leachate System Operation Process and Instrumentation Diagram (P&ID) is filed in the landfill office and provides further information on the operation of the leachate collection and treatment system.

The leachate is initially pumped to the on-site leachate storage tank prior to treatment. Liquid levels will be measured daily in the leachate storage tank units. The tank exterior will be visually inspected weekly. The tank interior will be inspected at least every three years, and more frequently if it is drained. At the time of draining, accumulated sediment will be removed and interior maintenance will be performed. If failures are detected, repairs will be made as soon as possible and before tank is brought back into operation. Electrical and mechanical equipment maintenance will follow manufacturer's recommendations. Inspection reports will be kept in the landfill office.

Presently the 7-acre closed landfill and the active landfill cells produce an average daily leachate generation of less than 12,000 GPD, providing more than 50% of capacity for future uses. Based on similar facilities, the new Transfer Station is anticipated to produce 167 GPD of leachate on average plus approximately 5,000 gallons per week during the tipping floor washdown.

Based on the operating record of the leachate treatment system, reports of influent and effluent quality and groundwater monitoring at the effluent disposal ponds, the leachate treatment system is performing adequately.

9.5 CONTINGENCY PLAN FOR MANAGING LEACHATE (Rule 62-701.500(8)(e), F.A.C.)

If on site leachate treatment is interrupted, leachate will be transported to one of several Citrus County Utilities wastewater treatment plants. Because multiple wastewater treatment plants are available for leachate disposal, complete interruption of off site disposal ability is not

anticipated.

9.6 RECORDING LEACHATE QUANTITIES (Rule 62-701.500(8)(f), F.A.C.)

Quantities of leachate collected by the leachate collection and removal system are recorded in gallons per day from the leachate flow observations. Utilities staff record daily flow amounts on a standard form. Completed forms are compiled monthly with the compiled form sent to the facility manager to be filed in the facility's operating record.

Attachment A
Emergency Incidents Plan

EMERGENCY INCIDENTS PLAN

for

THE TRANSFER STATION

and

RELATED FACILITIES

for

CITRUS COUNTY, FLORIDA

COMMISSIONERS
Dennis Damato, County Commission District 1
Gary Bartell, County Commission District 2
Joe Meek, County Commission District 3
John Thrumston, County Commission District 4
Winn Webb, County Commission District 5

ADMINISTRATION
Brad Thorpe, County Administrator
Eber Brown, Deputy County Administrator

COUNTY ATTORNEY
Robert B. Battista

DEPARTMENT OF PUBLIC WORKS
Glenn McCracken, Public Works Director

DIVISION OF SOLID WASTE MANAGEMENT
Casey Stephens, Director
Citrus County Division of Solid Waste Management
Citrus County Central Landfill
230 West Gulf to Lake Highway
Lecanto, Florida 34461
(352)527-7670

Updated August 2009

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Citrus County Division of Solid Waste Management
Citrus County Central Landfill
230 West Gulf to Lake Highway
Lecanto, Florida 34461
(352)527-7670

A. PURPOSE AND SCOPE

The purpose of this plan is to provide information and guidance for responses to emergency incidents at the Citrus County Transfer Station site and related facilities.

B. PREPAREDNESS

Local authorities have been notified, and will be kept apprised, of the operations at the Citrus County Transfer Station site, located at 230 West Gulf to Lake Highway, Lecanto, Florida, also known as the Citrus County Central Landfill Site. A site diagram will be provided as well as a copy of the contingency plan for all revisions.

A current copy of this plan will be maintained at the Central Landfill Administrative Office. The Citrus County Fire Services/Special Operations Section, the Department of Public Works and the Sheriff's Office have access to the SWM facilities.

Agencies Notified:

Hospital:	Citrus Memorial Hospital 502 West Highland Boulevard Inverness, Florida 34453	(352) 726-1551
Law Enforcement:	Citrus County Sheriff's Office 1 South Park Avenue Inverness, Florida 34453	(352) 726-4488
Emergency:	Emergency Response - 911 3549 Saunders Way Lecanto, FL 34461-7108	911
Fire and Hazardous:	Citrus County Department of Public Safety 3600 W. Sovereign Path, Suite 291 Lecanto, Fl. 34461	(352) 527-5406
Emergency Medical:	Nature Coast EMS 3876 W Country Hill Drive, Lecanto, Florida 34461	(352) 637-4121
Environmental:	Department of Agriculture and Consumer Services Division of Forestry 15019 Broad Street Brooksville, Florida 33512	(352) 796-5650

Agencies Notified: (continued)

Department of Environmental Protection
Division of Waste Management (813) 632-7600
13051 N. Telecom Parkway
Temple Terrace, Florida 33637

Every effort shall be made to operate the facilities in a safe manner. All necessary materials to contain small spills, fires or releases shall be maintained on site as outlined in the emergency supplies list. The ability to clean up all residues thereof will also be available. These supplies shall also be used to contain and cleanup any de minimus releases during normal operation. Good housekeeping will support a safer work environment.

C. EMERGENCY SUPPLIES LIST

Tools and small equipment:

Shovels	Poly, 65 Gal. Overpack Drum
Brooms	Poly, 3 0 Gal. Overpack Drum
Squeegee	Metal, 55 Gal. Drums
ABC Fire extinguishers	Poly, 5 5 Gal. Drums
Bung Wrench	Poly, 5 Gal. Pails
Hand Tools & Wrenches	Duct Tape
First Aid Kit	Scrub Bushes
PVC Hand Drum Pump (water & corrosives)	Poly Sheeting
Rotary Drum Pump (ignitable solvent pump)	Emergency Eye Wash & Shower Station
pH Testing Tape	Drum Wrenches
H_2O Testing Tape	Drum Placard Labeling Materials

MSA Passport Gas Meter measures –	Lower Explosive Limits	(LEL) ignitables
	Carbon Monoxide	(CO) combustion
	Oxygen	(O_2) low or super
	Hydrogen Sulfide	(H_2S) corrosion

Materials:

Mercury Absorbent	Absorbent Pads
Vermiculite, Bagged Absorbent	Absorbent Socks
Abzorbit, Bagged Absorbent	Sodium Bicarbonate neutralizer

Personal Protection Equipment (PPE)

Chemical Resistant Aprons	Personal Respirator
Chemical Resistant Coveralls	Face Shields
Chemical Resistant Shoe Covers	Both Neoprene and Nitrile Gloves
Chemical Resistant Smocks	Leather Work Gloves
Hardhats	Clear & Sunglass Safety glasses

Portable Heavy Equipment available at both the Transfer Station and the Landfill:

(2) Front-End Loader(s), John Deere, 644J, w/ 4 cu yard multi-purpose bucket

(2) Dump Trucks, Ford, Tandem Axle

Roll-off truck with 30 cu yd box

Tractor, medium duty, John Deere 2552, w/ front-end loader

Fork Lift, Caterpillar, Diesel

Bulldozer, Caterpillar D6

Compactor, Caterpillar 826 G

Compactor, Caterpillar 826 H

Self-Loading Scraper (Pan), Caterpillar 623F, 23 Yard

Fuel Truck, Ford F350 – with 400 gallon diesel fuel tank and air compressor

Water Truck, Ford 700, w/2000 gallon water tank & 100 g.p.m. pump (18 H.P. B&S)

(2) Lite Sets, Alamand, with 6kw generator

Dump Trailer, 6' x 12', Hydraulic

Grabber Attachment for 55 Gal. Drums for the Fork Lift

Generator, 150 kW Caterpillar (Olympian), Trailer mounted,

Water Transfer Pump, 4" outlet, Mack, Hydraulic drive

Water Transfer Pump, 4" outlet, Acme

Hand Tools and Mechanics Tools, at both the Maintenance Building and HHW.

D. SITE LAYOUT

See the site plan in Appendix 5 showing the different components of the facility. The site has been designed to provide proper emergency vehicle and equipment accessibility.

E. EMERGENCY RESPONSE COORDINATORS/EMERGENCY RESPONSE TEAM

Primary: **Casey Stephens - Director - Solid Waste Management**

Address: 780 South Suncoast Blvd., #7
Homosassa, Florida 34448

Phone:		
	(Work)	(352) 527-7670
	(Direct)	(352) 527-7671
	(Home)	(419) 367-1409
	(Cell)	(352) 302-6980

Secondary: **Carmen Bruno – Customer Service Supervisor**

Address: 5360 North Tumblewood Drive
Crystal River, FL 34428

Phone:		
	(Work)	(352) 527-7670
	(Direct)	(352) 527-7679
	(Home)	(352) 564-4213
	(Cell)	(352) 400-0674

Secondary: **Prime DeVaughn – Field Crew Leader - Landfill Operations**

Address: 1366 South Rock Crusher Road
Crystal River, Florida 34446

Phone:		
	(Work)	(352) 527-7670
	(Home)	(352) 628-7591
	(Cell)	(352) 400-1646

Emergency Response Coordinator Operations: In the event that local emergency response agencies are called, the first arriving company shall establish Incident Command. The command structure for that responding agency shall then be put into effect. The Solid Waste Management (SWM) Emergency Response Coordinator and response team shall be directed by the Incident Commander. During large operations, the SWM Emergency Response Coordinator may serve as or assign an individual to serve as part of a Unified Command Staff.

EMERGENCY INCIDENTS PLAN

Chain of Command:

Department of Public Works, Division of Solid Waste Management

Department Director	Glenn McCracken	(Cell) (352) 400-0650

Solid Waste Management - Landfill Operations:

Division Director	Casey Stephens
Customer Service Supervisor	Carmen Bruno
Field Crew Leader	Prime DeVaughn

In the event that the local emergency response authorities are called in, they will be tasked with establishing incident command.

The Solid Waste Management response team shall follow the response authority's direction.

Solid Waste Management Staff Listing:

Administration:

Casey Stephens,	Director
Claire Smith,	Senior Secretary
Cathy Winter-Kaminski,	Contract Services Specialist
Aaron Lake,	Equipment Maintenance Coordinator

Customer Service:

Carmen Bruno,	Customer Service Supervisor
Donna Yarborough,	Customer Service Representative
Owen Carney,	Recycling Coordinator

Citizen Service Area:

Norm Bowen,	Solid Waste Technician
Ronnie Weinman,	Solid Waste Technician

Household Hazardous Waste:

Paul Davis,	Household Hazardous Waste Coordinator
Dan Sherlock,	Hazardous Waste Specialist

Scalehouse Facility:

William Gilmore,	Solid Waste Technician, Lead
David Vance,	Solid Waste Technician
Judy Laubert,	Solid Waste Technician
Jean Poore,	Solid Waste Technician

Landfill Operations:

Prime DeVaughn,	Field Crew Leader
Scott Palmer,	Heavy Equipment Operator, Lead
Eric Heath,	Heavy Equipment Operator
Rich Martone,	Heavy Equipment Operator
Harold Gravely,	Heavy Equipment Operator
Mike Holst,	Heavy Equipment Operator

Leachate Treatment Plant: (contracted through the County's Utilities Division)

Gary Loggins,	Chief Plant Manager
Jerry Nusbaum,	Utilities Operator II

F. PREVENTION OF EMERGENCY SITUATIONS

Operations shall be conducted at the Transfer Station Facilities in a manner, which maximizes worker and environmental safety. No smoking shall be permitted in the facility's designated compound areas and access will be restricted to authorized personnel in some areas as needed. NO SMOKING signs shall be posted in areas around the facilities. Safety and operation plans shall be followed at all times.

(1) Scalehouse Operation Facility

In the event of an alarm, the Emergency Response Coordinator will be contacted.

(2) Maintenance Building / Diesel Fuel Facility

Fire extinguishers are located at both facilities. See Appendix 1 for material listing and quantities.

(3) Citizen Service Area (CSA)

Fire extinguishers are located at the waste tire site and Household Hazardous Waste (HHW) collection site. See Appendix 2 for materials and maximum site capacity.

(4) Hazardous Waste Collection and Storage Facility

The Hazardous Waste Collection Center and Storage Facility is outfitted with fire detection systems, portable ABC extinguishers, and automated fire suppression systems. See Appendix 3 for materials and maximum site capacity.

The Facility is also outfitted with an emergency shower and eye wash station.

See the *HHW Facility Standards and Emergency Incidents Plan, revised July, 2009,* for details

(5) Solid Waste Transfer Station

The transfer station building has a fire prevention system in place as well as waste management techniques that prevent fire from smoldering waste. The personnel assigned to this area will receive training in safety regulation and will be vigilant to safe operation within the tipping floor.

G. IDENTIFICATION OF EMERGENCY SITUATIONS

The following situations will be considered emergencies:

(1) Fire or smoke is detected

(2) An explosion occurs

(3) A serious leak or spill is detected

(4) Personal injury has occurred

(5) Any other incident that transpires which needs immediate attention, such as, but not limited to:

(a) Vehicle accident
(b) Helicopter accident, or
(c) Other incidents not covered above

H. EMERGENCY PROCEDURES

Whenever there is a perceived or actual emergency situation, the person who recognizes the emergency will notify the Administrative Office, via radio / phone, who will advise the Emergency Response Coordinator. The Emergency Response Coordinator shall take responsibility for implementing the contingency plan. If necessary the Emergency Response Coordinator shall notify all facility personnel and provide for their evacuation. If necessary, the notification plan must be implemented. The Emergency Response Coordinator shall direct facility staff in response procedures as the situation dictates.

Also, the Emergency Response Coordinator must assess possible hazards to human health or the environment that may result from the release, fire or explosion. This assessment must consider both direct and indirect effects.

During an emergency, the Emergency Response Coordinator must take all reasonable measures necessary to ensure that fire, explosions, and releases do not occur, reoccur or spread to other parts of the facility.

Under no circumstances shall life or property be put in deliberate peril in attempting to handle emergencies.

1. Emergency Procedure, Fire

The site will has dual potable water systems consisting of a domestic water system and a fire system. The fire system consists of a series of 8-inch water mains with fire hydrants placed no further than 400-feet from any building. In addition, the transfer station building and the office area of the HHW have automatic fire sprinkler systems.

A fire and potable water booster pump station provide pressure to meet fire flow requirements. The processing area of the HHW is equipped with an automatic foam fire protection system.

Fire extinguishers are present in each building and are mounted in the cab of all heavy machinery, control rooms, and electrical rooms.

The person who recognizes the emergency will also notify the Administrative Office, via radio / phone, who will advise the Emergency Response Coordinator. The Emergency Response Coordinator shall determine if outside agencies need to be contacted and if the facility should be evacuated.

In the event of a small fire, the personnel discovering the fire should determine if it could be extinguished safely and quickly with the available fire extinguishers. First consideration must be given to the safety of all people within the facility

If a fire is discovered in the transfer station by one of the transfer station spotters, they will first use their portable radio to contact supervision and inform them of the issue. Then the operator will evacuate any customers or staff that are in the affected area and, if possible move any equipment that could be damaged.

On-site personnel are aware of the location of all fire extinguishers, fire hoses, and emergency equipment. Only if trained and if they elect to, they may attempt to extinguish the flame with the fire suppression equipment at hand until the fire department arrives. If the operator is not trained and/or the fire is too large the building fire suppression system will be activated and the fire department will be automatically notified. The scale house operator will also close the facility to the public and vehicles will be asked to exit the facility. If the fire occurs when the station is unoccupied, the building's fire suppression system will automatically be activated and an alarm will be sent to the fire department.

Hot waste loads arriving at the facility will not be allowed to dispose of waste in the transfer station building. The scalehouse attendant or tipping floor spotter will request the driver to route the load to the active landfill area. Waste loads that arrive at the landfill on fire will not be deposited at the working face. They will be deposited away from the working face on an area that has previously been covered with daily soil cover. The load will then be spread out and covered with daily cover soil cover to extinguish the fire. If a fire does occur at the landfill working face, a temporary area will be identified as far away from the fire as possible but still within the limits of the lined disposal area where daily soil cover has previously been placed. Berms will be constructed around the temporary area using on-site equipment and soil materials from the on-site stockpile. The solid waste will remain in the temporary area until the fire is extinguished. Then the waste will be transported from the temporary area to the working face using on-site equipment. The soil berms around the temporary area will then be leveled and spread out over the surface at the temporary area.

In the event of a fire within the storage building at the Hazardous Waste Collection and Storage Facility, initial determination should be made concerning the safety of response actions. **The doors of the buildings should not be opened except as required to exit the building.**

2. Emergency Procedure, Explosion

If an explosion occurs, the person who recognizes the emergency will also notify the Administrative Office, via radio / phone, who will advise the Emergency Response Coordinator.

The Emergency Response Coordinator shall contact outside agencies and determine if the facility should be evacuated.

The incident shall be investigated and the appropriate response as outlined herein shall be taken.

3. Uncontrolled Leaks or Spills

In the event of an uncontrolled leak or spill, the personnel discovering the leak or spill should take the following actions, only if it is safe to do so:

- Notify the Administrative Office, via radio / phone, who will advise the Emergency Response Coordinator.
- Ensure safety of personnel in area, as necessary
- Eliminate sources of ignition
- Stop flow at the source
- Contain the leak or spill

The Emergency Response Coordinator shall direct facility staff in response procedures as the situation dictates. Actions may include, but not limited to:

- Evacuate area, if necessary
- Confirm identification of spilled material and check the Material Safety Data Sheets (MSDS) emergency procedures
- Confirm that additional personnel have been assigned to stop the flow of spilling product and secure leaks, if it can be done safely
- Assess the spill threat, site safety, and parameters such as spill volume, extent and direction of movement
- Follow up containment efforts
- Establish a Hot Zone and Safe Work Area
- Initiate clean up actions, if it can be done safely
- Initiate actions to notify local authorities, emergency response agency, and government agencies, as necessary
- Follow Cleanup / Decontamination procedures outlined in Item L. of this document.

4. Personal Injury

The personnel discovering the injured party should take the following actions:

- Notify the Administrative Office, via radio / phone, who will advise the Emergency Response Coordinator.
- Determine if the injured party needs assistance
- Apply First Aid in accordance with the care-giver's level of training

5. Unscheduled Shutdowns

In the event of an unscheduled shutdown of the CSA and transfer station caused by anything other than an emergency, all rolloff containers will be brought to the landfill to be emptied and then returned to the CSA or staged in the rolloff container storage area. All doors at the HHW facility will be closed and locked. The doors to the tipping floor will be closed and the scale house will notified to divert trucks delivering waste to the Landfill area. If the Solid Waste Management Division Director did not initiate the shutdown, the transfer station spotter will notify he or she, or their designee, of the issue causing the shutdown. If the shutdown impacts the tunnel area those doors shall also be closed.

6. Other Miscellaneous Emergency Incidents

For any other perceived, imminent or actual emergency situation, the person who recognizes the emergency will notify the Administrative Office, via radio or phone, who will advise the Emergency Response Coordinator. The Emergency Response Coordinator shall take responsibility for implementing the contingency plan. If necessary the Emergency Response Coordinator shall notify all facility personnel and provide for their evacuation and the notification plan must be implemented. The Emergency Response Coordinator shall their staff in response procedures, as the situation dictates.

Also, the Emergency Response Coordinator must assess possible hazards to human health or the environment that may result from any release, fire or explosion. This assessment must consider both direct and indirect effects.

During an emergency, the Emergency Response Coordinator must take all reasonable measures necessary to ensure that fire, explosions, and releases do not occur, reoccur or spread to other parts of the facility.

I. EVACUATION

In the event that the facility needs to be evacuated, the Emergency Response Coordinator shall notify County personnel by portable radio and the contingency and notification plan will be implemented. Due to the nature and location of the emergency, the Emergency Response Coordinator shall advise County personnel which evacuation route and plan to implement. Operations staff shall proceed to inform all non-county personnel on site and assist with their safe exit.

Traffic on roads into the facility will be stopped and re-routed as necessary by Scalehouse personnel. Clear access by response personnel and vehicles to the emergency shall be maintained at all times by County personnel.

Upon completion of evacuation of the facility, all personnel are to proceed directly to the staging area designated by the Emergency Response Coordinator.

Primary Staging Area: Administrative Office.

Secondary Staging Area: Dry Storage Building

J. NOTIFICATION

Whenever there is an imminent or actual emergency situation, the person who recognizes the emergency will notify the Administrative Office, via radio / phone, who will advise the Emergency Response Coordinator. The Emergency Response Coordinator shall take responsibility for implementing the contingency plan. If necessary the Emergency Response Coordinator shall notify all facility personnel and provide for their evacuation. Generally, the most expedient method of notification shall be by two-way radio. The Emergency Response Coordinator shall direct facility staff in response procedures, staging areas or evacuation routes, as the situation dictates.

K. FOLLOW UP REPORTING

1. Initially, whenever there is an imminent or actual emergency situation, the Emergency Response Coordinator (or their designee when the Emergency Response Coordinator is on call) should immediately:

    a. Activate internal facility alarms or communication systems, where applicable, to notify all facility alarms or communication systems.
    b. Notify appropriate state or local, emergency response agencies with designated response roles, if their help is needed.

2. In addition, whenever there is a release, fire, or explosion, the Emergency Response Coordinator should immediately identify the character, exact source, amount, and the extent of any released materials. He or she may do this by observation or review of facility records, or if necessary, by chemical analysis.

3. Concurrently, the Emergency Response Coordinator should assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment should consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to

control fire, or heat-induced explosions).

4. If the Emergency Response Coordinator determines that the facility has had a release, fire, or explosion, which could threaten human health, or the environment, outside the facility, he should report his findings as follows:

   a. If his assessment indicates that evacuation of local areas may be advisable, he should immediately notify appropriate local authorities. The Emergency Response Coordinator should be available to help appropriate officials decide whether local areas should be evacuated; and

   b. He/she should immediately notify either the government official designated as the on-scene coordinator for the area or the State Warning Point (using their 24-hour number 904/488-1320). The report should include:

      i. Name and telephone number of person reporting;
      ii. Name and address of facility;
      iii. Time and type of incident (e.g., release, fire);
      iv. Name and quantity of material(s) involved, to the extent known;
      v. The extent of injuries, if any; and
      vi. The possible hazards to human health, or the environment, outside the facility.

5. During the emergency, the Emergency Response Coordinator should take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other areas of the facility. These measures should include where applicable, stopping processes and operations, collecting and containing release waste, and release waste, and removing or isolating containers.

6. During an emergency, the Emergency Response Coordinator should monitor for leaks, pressure buildup, gas generation, or ruptures in containers and/or equipment, wherever this is appropriate.

7. Immediately after an emergency, the Emergency Response Coordinator should provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material contaminated by a release, fire, or explosion at the facility.

8. The Emergency Response Coordinator should ensure that, in the affected area(s) of the facility,

   a. No waste that may be incompatible with the released material is stored or handled until cleanup procedures are complete; and

b. All emergency equipment listed in the Emergency Incidents Plan is cleaned and fit for its intended use before operations are resumed.

9. The owner or operator should notify appropriate State and local authorities, in writing, that the facility is once again functional before operations are resumed in the affected area(s) of the facility.

10. The owner or operator should note, in the operating record, the time, date, and details of any incident that requires implementation of the Emergency Incidents Plan. Within 24 hours after the incident, the situation shall be reported to the Department of Environmental Protection (District Office Hazardous Waste Supervisor), and a written report on the incident should be submitted within 15 days. The report should include:

    a. Name, address, and telephone number of the owner or operator;
    b. Name, address, and telephone number of the facility;
    c. Date, time and type of incident (e.g., fire, explosion);
    d. Name and quantity of material(s) involved;
    e. The extent of injuries, if any;
    f. An assessment of actual or potential hazards to human health or the environment, where this is applicable; and
    g. Estimated quantity and disposition of recovered material that resulted from the incident.

L. CLEANUP/DECONTAMINATION

All residues from a release, fire or explosion shall be contained and cleaned up in a manner consistent with the emergency spill procedure.

Immediately after the emergency, the Emergency Response Coordinator shall provide for treating, storing or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire or explosion at the facility.

The Emergency Response Coordinator must ensure that in the affected areas of the facilities:

(1) No waste that may be incompatible with the released material is treated, stored or disposed of until clean up procedure are completed; and

(2) All emergency equipment listed in this contingency plan is cleaned and fit for its intended use before operations are resumed.

Any contaminated equipment shall either be cleaned with a suitable solvent, and the discarded solutions handled in an appropriate manner, or discarded with the spill clean up material.

Decontamination shall be conducted in accordance with an appropriate decontamination program.

APPENDIX ONE

Operations Maintenance Building

and Diesel Fuel Facility

OPERATIONS
MAINTENANCE BUILDING
AND
DIESEL FUEL FACILITY

Chemical Listing	Maximum Quantities on Site
Maintenance Building:	
Cans of Gasoline	8 – 5 gallon cans
Oil	2 – 55 gallon drum
Hydraulic Oil	2 – 55 gallon drum
Grease	2 – 120 pound drums
Adhesive for plastics	5 – 5 gallon containers
Fuel Truck (parked in building at night)	450 gallons diesel fuel
Diesel Fuel Facility:	
Diesel fuel	2 – 12,000 gallon tanks 3 – 500 gallon tanks
Unleaded fuel	1– 500 gallon tank

APPENDIX TWO

Citizen Service Area (CSA)

Material and Maximum site capacity

Household Garbage & Trash	7 – 30 yd Dumpsters
Waste Tires	115 tons
Scrap Metal	50 tons
Wood Waste	Unprocessed 1500 tons Processed 1,500 tons

APPENDIX THREE

Household Hazardous Waste Hazards

Stored Materials, UN ID Number, and Quantities Stored

HOUSEHOLD HAZARDOUS WASTE COLLECTION CENTER
MATERIAL LISTING AND QUANTITIES STORED

Stored Waste Materials	UN ID Number	Maximum Quantities Stored
Flammable Liquid, n.o.s.	UN 1993	(5) 55 Gal. Drums
Bulk, Oil Based Paint	UN 1263	(4) 55 Gal. Drums
Containers, Oil Based Paint	UN 1263	(1) Gaylord Box @ 700 lbs.
Solvent Tars & Adhesives	UN 1999	(2) Gaylord Box @ 700 lbs.
Bulk, Oil Solvents Tars & Adhesives	UN 3175	(3) 55 Gal. Drums
Small Flammable Solids	UN 3175	(3) – 55 Gal. Drums
Mixed Aerosols	UN 1950	(3) – 55 Gal. Drums
Motor Oil	Unregulated	(1) – 55 Gal. Drum
Waste Oil Site		3 - 500 gallon containers
Anti-Freeze		1 - 500 gallon tank
Lead Acid Batteries		4 Pallets (50 – 75 batteries per pallet)
Corrosive Solid, Basic, Inorganic, n.o.s.	UN 3262	100 lbs.
Corrosive Liquid, Acid, Inorganic, n.o.s.	UN 3264	250 lbs.
Corrosive Liquid, Acid, Organic, n.o.s.	UN 3265	100 lbs.
Corrosive Liquid, Basic, Inorganic, n.o.s.	UN 3266	200 lbs.
Corrosive Liquid, Basic, Organic, n.o.s.	UN 3267	250 lbs.
Toxic Pesticides Liquids	UN 3021	400 lbs.
Toxic Pesticides Solids	UN 2930	800 lbs.
Oxidizing Liquid, n.o.s.	UN 3139	200 lbs.
Oxidizing Solid, n.o.s.	UN 1479	100 lbs.
P.C.B.s in Electronic Parts	UN 2315	100 lbs.
Flares, Fuses, Fireworks	Class 1.4	50 lbs.
Small Arms Ammunition	Class 1.4	100 lbs.

APPENDIX FOUR

24-Hour Recycling Center

24-Hour Recycling Center

Material Capacity

1 – 30 yd container of newspaper

1 – 30 yd container of glass & aluminum / steel

1 – 30 yd container Plastic

1 – 30 yd container Cardboard

1 – 20 yd container flower pots

1 – 20yd container clean white packing Styrofoam

1 – 20yd container mixed paper

APPENDIX FIVE

Site Plan

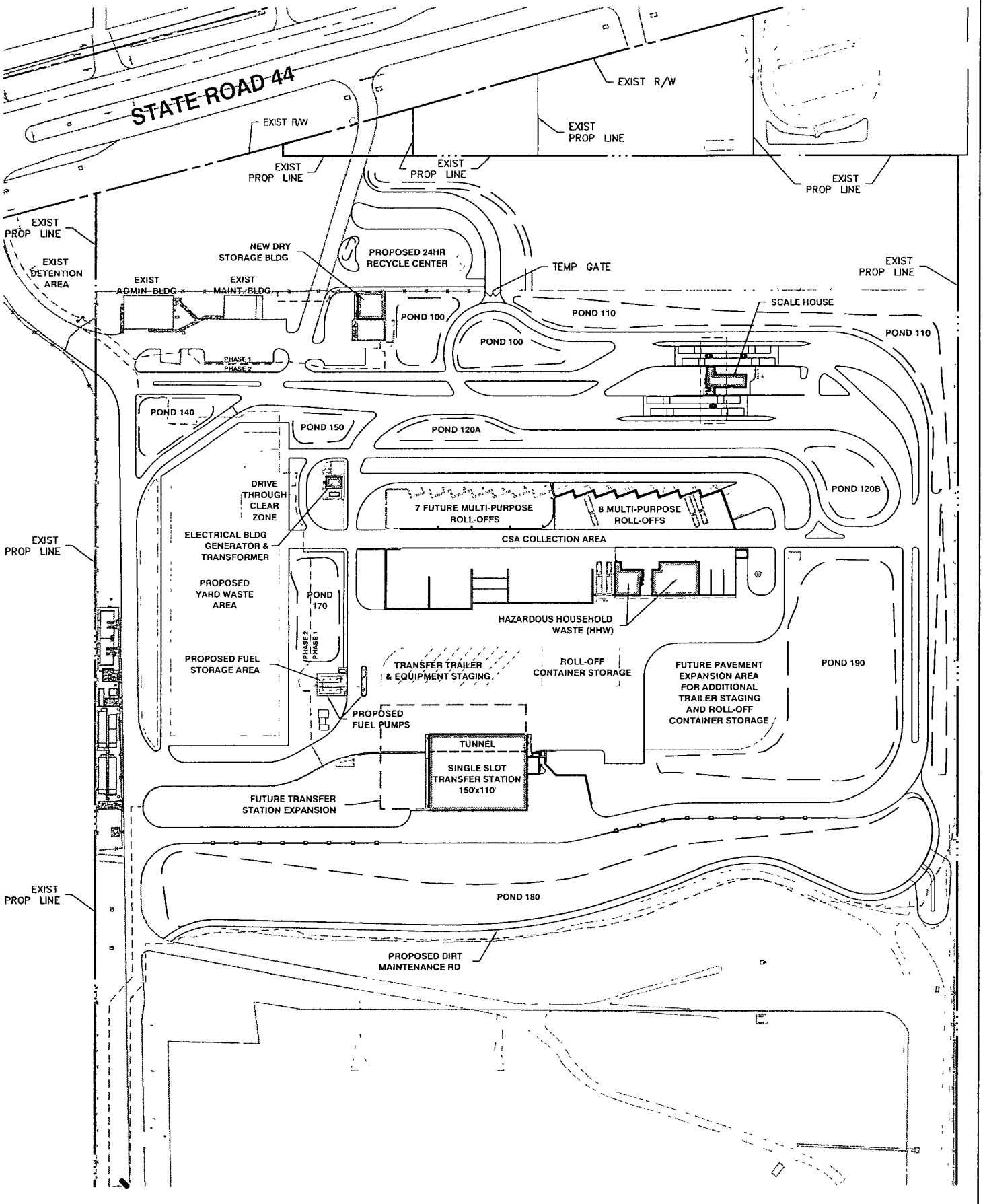

FIGURE 1-1

CITRUS COUNTY SOLID WASTE MANAGEMENT FACILITY SITE PLAN

JOB NO	PREPARED BY
4217-001-001	King ENGINEERING ASSOCIATES INC
DATE 06/09/09	4921 Memorial Highway One Memorial Center, Suite 300 Tampa, Florida 33634 Phone 813 880-8881 Fax 813 880-8882 www kingengineering com Engineering License #2610
SCALE 1 = 200'	
DRAWN BY RNC	

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O:\PW-Civil\4217\001\001\cadd\CONCEPT\PLN PSP-8X11 dwg , August 25, 2009 5 03 PM, CSG King Engineering Associate Inc

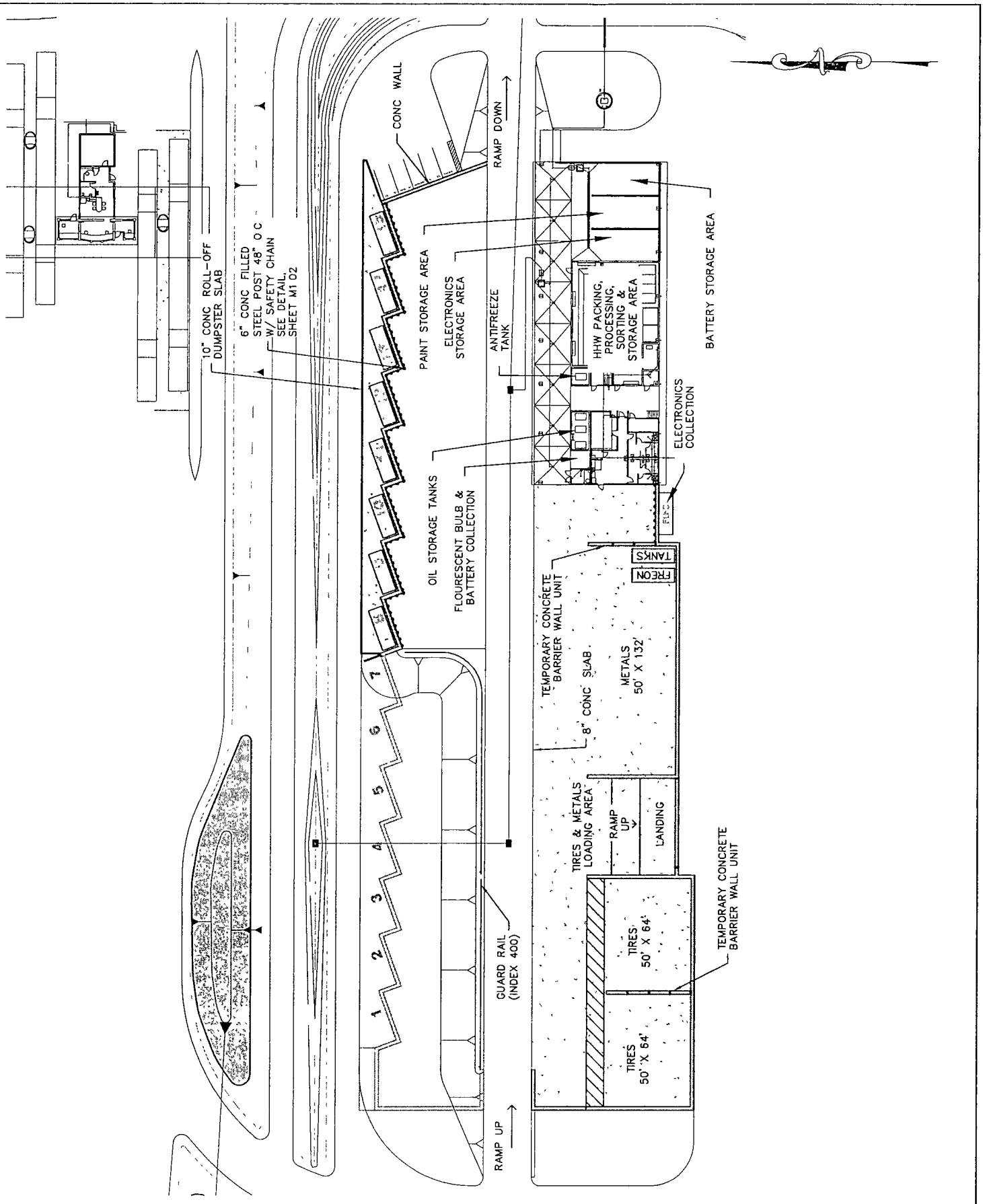

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FIGURE 1-2

CITRUS COUNTY SOLID WASTE CSA & HHW SITE PLAN

JOB NO	4217-001-001
DATE	06/09/09
SCALE	1 = 75'
DRAWN BY	RNC

PREPARED BY
King
ENGINEERING ASSOCIATES INC
4921 Memorial Highway
One Memorial Center, Suite 300
Tampa, Florida 33634
Phone 813 880-8881
Fax 813 880-8882
www kingengineering com
Engineering License #2610

Attachment B
Household Hazardous Waste Facility Standards and Emergency Incidents Plan

FACILITY STANDARDS

And

EMERGENCY INCIDENTS PLAN

For the

CITRUS COUNTY

HOUSEHOLD HAZARDOUS WASTE COLLECTION AND STORAGE FACILITY

Located at the

Citrus County Central Landfill
230 West Gulf to Lake Highway
Lecanto, FL

Prepared by

Department of Public Works
Division of Solid Waste Management

Updated August 2009

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HAZARDOUS WASTE COLLECTION AND STORAGE FACILITY

HISTORY

The Citrus County Board of County Commissioners has sponsored the Household Hazardous Waste (HHW) collection program since the late 1980's. The Florida Department of Environmental Protection assisted Citrus County by initiating Household Hazardous Waste "Amnesty Days", two times per year, utilizing a newly purchased collection and storage facility. In the late 1990's, personnel within the Citrus County Hazardous Material Team were used to oversee the HHW and CESQG programs. In 2008, the Citrus County Board of Commissioners hired a Hazardous Waste Coordinator to oversee the HHW and CESQG programs and a Hazardous Waste Specialist to assist the Coordinator and to operate the County CESQG program.

The plans for redevelopment of the north portion of the landfill area include a new Household Hazardous Waste Building within the Citizens Service Area (CSA). Access is provided through the main entrance on SR 44, clients then pass the scale house and are directed to follow the signs to access the HHW area. The building was engineered to comply with EPA, NFPA, and OSHA standards and regulations for storing hazardous chemicals and wastes. The building is also corrosion resistant and features interior, secondary containment for the prevention of spills or leaks.

The Citrus County Hazardous Waste Collection Center currently accepts flammable liquids, flammable solids, oxidizers, corrosives, poisonous hazardous waste and a limited amount of Class 1, Division 1.4 materials from households and specific, known, and stable business wastes from Conditionally Exempt Small Quantity Generators which are licensed and situated within Citrus County.

INTRODUCTION

Citrus County has a permanent Household Hazardous Waste (HHW) program and Conditionally Exempt Small Quantity Generator (CESQG) program for the collection of waste materials at the Household Hazardous Waste Collection Center. Due to the origin of these materials, by statute, they are exempt from many Federal and State Regulations.

Citrus County has adapted/modified the proposed HHW Facility Standards (draft 3 – July 1996), as prepared by Committee Members, State of Florida County Household Hazardous Waste Project Managers, as guidance to a site specific guideline for Citrus County personnel utilization for facility operations, in accordance with section "Applicability". The standards were proposed for facilities which collect HHW with in-house staff, and,

1 also bulk, neutralize or otherwise treat waste; or
2. also collect CESQG waste with in-house staff; or

3. both 1 and 2 above."

The Citrus County Division of Solid Waste Management, through its Household Hazardous Waste Collection Center, performs both operations 1 and 2 above.

I. FACILITY PERSONNEL

1. Facility Manager shall be the Director for the Division of Solid Waste Management, Department of Public Works;

2. Facility Site Supervisor shall be the Hazardous Waste Coordinator, Division of Solid Waste Management, and/or his/her assignee;

3 Facility Site Assistant shall be the Hazardous Waste Specialist, Division of Solid Waste Management, and/or his/her assignee;

4. Facility Staff Spotter shall be Solid Waste Management personnel trained in the facility operational and spotting requirements; and,

5. Facility Site Staff, during times of program operation, shall be personnel trained in the facility operational requirements.

HHW AND CESQG OPERATIONAL CHAIN OF COMMAND:

Division Director	Casey Stephens
Customer Service Supervisor	Carmen Bruno
Hazardous Waste Coordinator	Paul Davis
Hazardous Waste Specialist	Dan Sherlock

II. PHYSICAL FACILITY - MINIMUM STANDARDS

A. Containment

1. All waste shall be stored in either the HHW storage building, in drums or on the secondary containment pallets at the facility.

2. All liquid waste shall be stored within secondary containment structures capable of containing 110% of the largest container in storage.

3. Containers holding liquid shall be placed so that material escaping from a small leak in a non-pressurized container will not fall outside the containment structure.

4. All non-liquid waste shall be stored within secondary containment structures capable of containing all stormwater reasonably expected to fall or run onto the structure in a 25 year storm or on a paved and sheltered surface which would be substantially unaffected by a 25 year storm.

5. Stormwater shall be prevented from accumulating within in-service containment structures in amounts in excess of 10% of their volume.

6. Containers shall be protected from deterioration due to excessive exposure to stormwater or condensation.

B. Required Equipment

During hours of operation the facility is equipped with the following, unless none of the hazards posed by waste handled at the facility could require a particular kind of equipment specified below:

1. Voice communication from the site supervisor shall be utilized to provide immediate emergency instruction to facility personnel;

2. A device, such as a portable telephone available at the scene of operation, or a hand-held two-way radio, capable of summoning emergency assistance from local police department, fire department, or State or local emergency response teams;

3. Portable, Class ABC fire extinguishers

4. Spill control, absorbent pads, socks, materials and equipment, including all necessary and appropriate personal protective equipment (PPE) and clothing and decontamination equipment

5. If needed, there is equipment at the Landfill capable of providing water at adequate volume and pressure to supply water hose streams, or water spray systems for fire suppression and/or decontamination.

6. Emergency shower and eyewash station.

III. WASTE ACCEPTANCE CRITERIA

A. Household Waste

The facility shall only accept household hazardous waste if:

1. It is acceptable material for disposal with the County's Hazardous Waste Contractor;

2. If it is generated from a Citrus County residence; and

3. If it can be safely stored prior to disposal.

B. CESQG Waste

Facility personnel will enforce the following additional criteria with respect to any CESQG waste that they accept. (This section applies to wastes that the facility accepts, not to waste accepted directly by the disposal contractor):

1. They verify that the source is Citrus County generated and Conditionally Exempt;

2. It is acceptable material for disposal with the County's Hazardous Waste Contractor;

3. They do not accept unknown chemicals or compounds from CESQG's. The generator is required to identify the process generating the waste and all materials that were used in the process. From that information, the generator or the facility supervisor should be able to determine which EPA waste codes are applicable to that waste;

4. They only accept waste if they can verify that it is what the generator says it is; and,

5. It can be safely stored prior to disposal.

6. Whenever possible, businesses needing to dispose of their CESQG waste will be directed to and provided a listing of the various, available, hazardous waste collection contractors serving the Citrus County area.

C. Acceptance of Materials during Normal Operating Hours:

1. Household Hazardous Waste shall be accepted from County residents on Tuesday, Thursday, and Friday, from 9:00 am till 1:00 pm.

2. Upon arrival at the HHW Collection Center (HHWCC), participants will be informed of the NO SMOKING requirement, if necessary, and asked to unload their vehicle and place items on the carts (staff will assist, as needed).

3. HHWCC staff, wearing appropriate PPE, will unload and process the participants' waste, as follows:

    - Identifies chemicals by label information and/or inquiries of the participant.
    - Verifies acceptability of chemicals using acceptable and non-acceptable materials charts and standards.
    - Refers participant for disposal of non-acceptable materials.
    - Directs and assists in removing materials from vehicle.
    - Upon removal of leaking or open containers, places such into poly bags or over-packs, in appropriate containers, using absorbent material.
    - Places materials onto cart(s).
    - Labels any materials which are insufficiently labeled.
    - Assists participant on exiting the site.
    - Following segregation procedures, sorts and segregates materials by:
        1. DOT Hazard Class
        2. Chemical compatibility

D. Acceptance of Materials Outside of Normal Collection Hours:

1. If the resident is unable to be at the HHW Collection Center during normal collection periods, household hazardous waste may be accepted from Citrus County residents, preferably, by appointment only.

2. The Scalehouse operator will first screen incoming waste. If a citizen cannot dispose of their HHW during normal acceptance times, the Scalehouse operator shall direct the participant to a Citizen Service Area staff spotter. Before taking possession of the waste, the CSA staff spotter shall question the person delivering the hazardous waste, to ascertain that it is only from a residential source and to the exact nature of its contents.

3. If the material is paint or a paint related material, staff will ascertain whether or not the can is empty and shall dispose of empty containers as solid waste. If the material is a latex and solid, staff may dispose of the container as solid waste.

4. All paint-related wastes will be collected at the HHW Collection Center.

5 At the end of every work day, the Citizen Service Area staff spotter will check the citizen's service area drop-off site for any household hazardous waste that may have been left. If the CSA staff spotter discovers questionable, unknown or non-paint material, the Household Hazardous Waste Coordinator or their designee shall be contacted for guidance and for disposal assistance.

IV. PERSONNEL

A. Training

HHW facility personnel and staff spotter(s) shall successfully complete training program(s) that teach them to perform their duties in a way that ensures the facility is operated in a manner that protects them and the public from potential health and safety hazards at the site and is protective of the environment.

1. Each individual involved with the HHW program shall receive training and certification according to their job description and scope of responsibility. Each training program shall be taught by a person who is certified to train others in hazardous waste management procedures, including instruction in regard to personnel hazardous waste management procedures. The person providing the training shall have no less than 40 hours training in appropriate

aspects of hazardous waste/material management including selection of protective clothing and equipment and emergency response.

2. At a minimum, the initial training program is designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with HHW material acceptance procedures, emergency procedures, including Emergency Incidents Plan implementation, emergency equipment, and emergency systems, including where applicable:

   a. Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
   b. Communications or alarm systems;
   c. Response to fires or explosions;
   d. Response to discharges to the land surface; incidents; and,
   e. Shutdown of operations.

3. All personnel who handle hazardous waste (or items, which would be hazardous waste if regulated) are trained in sorting materials by hazard class and compatibility group.

4. Facility personnel shall successfully complete their initial training program within six months after the date of their employment or assignment to a facility. New employees shall not work in unsupervised positions until they have completed the training requirements.

5. The Hazardous Waste Coordinator shall perform an annual review of the minimum, initial training requirement and of each member's needs and progress toward achieving such training.

6. Facility personnel who receive CESQG waste, bulks or otherwise treats any waste material, should have on staff and on duty, at least one person who has no less than 40 hours training in appropriate aspects of hazardous waste/material management including selection of protective clothing and equipment and emergency response

B. Personnel Records

The following documents and records shall be maintained at the facility manager's office:

1. The job title for each position at the facility related to hazardous waste management, and the name of the employee filling each job;

2. A written job description for each position. This description may be consistent in its degree of specificity with descriptions for other similar positions at the same site, but should include the requisite skill, education, or other qualifications, and duties of facility personnel assigned to each position;

3. A written description of the type and amount of both introductory and continuing training that will be given to each person filling a position; and,

4. Record that documents that the training or job experience required for each position has been completed by facility personnel.

V. OPERATIONS

A. Maintenance and Operation of HHW Facility

1. The facility shall be maintained and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water that could threaten human health or the environment.

2. All facility communications or alarm system, fire protection equipment, spill control equipment, and decontamination equipment, where required, shall be tested and maintained in accordance with manufacturer's recommendations and as necessary to assure its proper operation in time of emergency.

3. Facility personnel shall maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency, unless aisle space is not needed for any of these purposes

4. Whenever hazardous waste is being poured, mixed, bulked, or otherwise handled, all personnel involved in the operation shall have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee, unless such a device is not necessary.

5. Normal operational procedures requires two personnel on site at all times, but, if there is ever just one employee on the premises while the facility is in operation, he shall have immediate access to a device, such as a telephone (immediately available at the scene of operation) or a hand-held two-way radio, capable of summoning emergency assistance (Telephones and

radios shall not be placed in areas where the atmosphere may become explosive due to the presence of flammable vapors, dusts, or gases.)

B. Accumulation Time

1. The HHW collection facility will be accumulating household hazardous waste and CESQG waste on-site, and shall store the material as follows:

   a. The waste will be placed in containers; a container may be considered a storage building or a DOT approved drum.
   b. The amount of waste accumulated will not place the facility in violation of any part of section II.A, V.D, or V E; and,
   c. While being accumulated on-site, each container is labeled with the appropriate DOT label and a description of the contents. A proper label on the storage building door describes the hazardous properties of the materials stored inside.

2. The household hazardous waste and CESQC waste collected for treatment or disposal shall not be accumulated on site for more than 210 days. Once the capacity limit or accumulation time limit is reached, all hazardous waste collected shall be shipped to a permitted hazardous waste facility for treatment or disposal. The operator may request DEP approval of a longer accumulation time period for specific wastes which are accumulated slowly.

C. Management of Containers

1. If a container holding hazardous waste is not in good condition or if it begins to leak, the operator shall pack the container and its contents in a larger container that is in good condition, or manage the waste in some other way that complies with the requirements of this part.

2. The operator shall use containers made of or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired and is in compliance with that material's packing code.

3. A container holding hazardous waste should always be closed during storage, except when it is necessary to add or remove waste.

4. A container holding hazardous waste should not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.

5. HHW staff shall inspect areas where containers are stored, at least weekly, looking for leaks and for deterioration caused by corrosion or other factors. The operator shall keep records and results of these weekly inspections.

D. Special Requirements for Ignitable or Reactive Waste

1. Containers holding ignitable or reactive waste shall be located within the transfer/containment slab, within a secondary containment area and grounded to minimize static electricity.

2. HHW staff shall take precautions to prevent accidental ignition of ignitable waste. This waste will be separated and protected from sources of ignition including but not limited to: open flames, smoking, cutting and welding, hot surfaces frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e.g., from heat-producing chemical reactions), and radiant heat. While ignitable waste is being handled, the owner or operator should confine smoking and open flame to a specially designated location. "No Smoking" signs are conspicuously placed wherever there is a hazard from ignitable waste.

3. Reactive wastes shall receive such special handling and storage as needed to prevent unintentional reactions.

E. Special Requirements for Incompatible Wastes

The following are guidelines for prevention of fires, explosions, gaseous emissions, leaching, or other discharge of hazardous waste or hazardous waste constituents which could result from the mixing of incompatible waste or if a container breaks or leaks.

1. Incompatible waste and materials should not be placed in the same container;

2. Hazardous waste should not be placed in an unwashed container that previously held an incompatible waste or material; and,

3 Incompatible wastes should be stored separately. They should be separated by a minimum of two impervious barriers such that, should any one container fail, no waste or vapors will come into contact with incompatible material or containers.

F. Handling Requirements for Ignitable, Reactive, or Incompatible Wastes

Repackaging or treatment, including bulking, or neutralizing of ignitable, reactive, or incompatible waste, shall be conducted so that it does not:

1. Generate extreme heat or pressure, fire or explosion, or violent reaction;

2. Produce uncontrolled toxic vapors, dusts, or gases in sufficient quantities to threaten human health;

3. Produce uncontrolled flammable vapors, dusts, or gases in sufficient quantities to pose a risk of fire or explosion;

4 Damage the structural integrity of the device or facility containing the waste; or,

5. Threaten human health or the environment.

VI. PREPAREDNESS AND PREVENTION

A. Arrangements with Local Authorities

1. The Facility Manager shall make the following arrangements, through distribution of an Emergency Incidents Plan, outlining the type of waste handled at the facility and the potential need for the services of these organizations:

   a. Arrangements to familiarize police, fire department, and emergency response teams with the layout of the facility, properties of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to roads inside the facility, and possible evacuation routes;

   b. Where more than one police and fire department might respond to an emergency, agreements designating primary emergency authority to a specific police and a specific fire department, and agreements with any other to provide support to the primary emergency authority;

   c. Agreements with State emergency response teams, emergency response contractors, and equipment suppliers; and,

   d. Arrangements to familiarize local hospitals with the properties of hazardous waste handled at the facility and the types of injuries or

illnesses that could result from fires, explosions, or release at the facility.

B. HHW COLLECTION CENTER EMERGENCY EQUIPMENT

Available emergency equipment is listed in Section C of the Transfer station Emergency Incidents Plan.

VII. EMERGENCY INCIDENTS PLAN AND PROCEDURES

A. EMERGENCY RESPONSE COORDINATOR

Primary: **Casey Stephens - Director - Solid Waste Management**

Address: 780 South Suncoast Blvd., #7
Homosassa, Florida 34448

Phone: (Work) (352) 527-7670
(Direct) (352) 527-7671
(Home) (419) 367-1409
(Cell) (352) 302-6980

Secondary: **Carmen Bruno – Customer Service Supervisor**

Address: 5360 North Tumblewood Drive
Crystal River, FL 34428

Phone: (Work) (352) 527-7670
(Direct) (352) 527-7679
(Home) (352) 564-4213
(Cell) (352) 400-0674

Secondary: **Prime DeVaughn – Field Crew Leader - Landfill Operations**

Address: 1366 South Rock Crusher Road
Crystal River, Florida 34446

Phone: (Work) (352) 527-7670
(Home) (352) 628-7591
(Cell) (352) 400-1646

Emergency Response Coordinator Operations: In the event that local emergency response agencies are called, the first arriving company shall establish Incident

Command. The command structure for that responding agency shall then be put into effect. The Solid Waste Management (SWM) Emergency Response Coordinator and response team shall follow the Incident Commander's direction. In large operations, the SWM Emergency Response Coordinator may serve as or assign an individual to serve as part of a Unified Command Staff.

B. EMERGENCY RESPONSE PROCEDURES

1. Whenever there is a perceived, imminent or actual emergency situation, the Emergency Response Coordinator (or their designee when the Emergency Response Coordinator is on call) should immediately:

    a. Activate internal facility alarms or communication systems, where applicable, to notify all facility staff personnel.
    b. Notify appropriate state or local emergency response agencies with designated response roles if their help is needed.

2. Whenever there is a release, fire, or explosion, the Emergency Response Coordinator should immediately identify the character, exact source, amount, and the extent of any released materials. He or she may do this by observation or review of facility records, or if necessary, by chemical analysis.

3. Concurrently, the Emergency Response Coordinator should assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment should consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire, or heat-induced explosions).

4. If the Emergency Response Coordinator determines that the facility has had a release, fire, or explosion, which could threaten human health, or the environment, outside the facility, he should report his findings as follows:

    a. If his assessment indicates that evacuation of local areas may be advisable, he should immediately notify appropriate local authorities. The Emergency Response Coordinator should be available to help appropriate officials decide whether local areas should be evacuated; and,

    b. He/she should immediately notify either the government official designated as the on-scene coordinator for the area or the State

Warning Point (using their 24-hour number 904/488-1320). The report should include:

i. Name and telephone number of person reporting;
ii. Name and address of facility;
iii Time and type of incident (e.g., release, fire);
iv. Name and quantity of material(s) involved, to the extent known;
v. The extent of injuries, if any; and,
vi. The possible hazards to human health, or the environment, outside the facility.

5. During the emergency, the Emergency Response Coordinator should take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other areas of the facility. These measures should include where applicable, stopping processes and operations, collecting and containing release waste, and release waste, and removing or isolating containers.

6. During an emergency, the Emergency Response Coordinator should monitor for leaks, pressure buildup, gas generation, or ruptures in containers and/or equipment, wherever this is appropriate.

7. Immediately after an emergency, the Emergency Response Coordinator should provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material contaminated by a release, fire, or explosion at the facility.

8. The Emergency Response Coordinator should ensure that, in the affected area(s) of the facility;

a. No waste that may be incompatible with the released material is stored or handled until cleanup procedures are complete; and,
b. All emergency equipment listed in the Emergency Incidents Plan is cleaned and fit for its intended use before operations are resumed.

9. The owner or operator should notify appropriate State and local authorities, in writing, that the facility is once again functional before operations are resumed in the affected area(s) of the facility.

10. The owner or operator should note in the operating record the time, date, and details of any incident that requires implementing the Emergency Incidents Plan. Within 24 hours after the incident, the situation shall be reported to the Department of Environmental Protection (District Office

Hazardous Waste Supervisor), and a written report on the incident should be submitted within 15 days. The report should include:

a. Name, address, and telephone number of the owner or operator;
b. Name, address, and telephone number of the facility;
c. Date, time and type of incident (e.g., fire, explosion);
d. Name and quantity of material(s) involved;
e. The extent of injuries, if any;
f. An assessment of actual or potential hazards to human health or the environment, where this is applicable; and,
g. Estimated quantity and disposition of recovered material that resulted from the incident.

VIII. FLOOR DRAIN VALVES AND PUMP STATIONS OPERATION

A. VALVE AND SUMP FOR DRIVE-THROUGH AREA

The drains at the drive-through area of the HHW discharge to a sump at the north side of the building then through a 4-inch valve to Pond 190. The valve shall be normally closed when the facility is receiving HHW and normally open when the facility is not receiving HHW. By keeping the valve closed during operation, a spill can be contained and cleaned up without discharge to the stormwater pond. If a spill occurs, the spilled material will be cleaned up, and water in the sump will be checked for color, odor, phase separation or other signs that spilled material may have entered the sump. Specific conductance and pH will be checked in the sump water. If there is a possibility that spilled material has entered the drains, pipes or sump, the water will be removed from the sump by vacuum truck and the drains, pipes and sump will be flushed with water to remove residual spill material. Soap or other cleaning materials may be used in the cleaning operation depending of the type of material that was spilled. All wash water will be contained and removed using the vacuum truck. The recovered water will be tested as necessary to determine the proper disposal procedure.

B. VALVE AND SUMP FOR TRENCH DRAIN IN STORAGE AREA

The trench drain in the storage area of the HHW discharges to a sump at the east side of the storage area then through a 4-inch valve to a pump station. The valve will be normally closed at all times except to drain clean blown-in stormwater from the storage area floor. Prior to discharging stormwater to the pump station, the water in the sump will be checked for color, odor, phase separation and other signs that spilled material may have entered the sump. Specific conductance and pH will be checked in the sump water. If there is a

possibility that spilled material has entered the drains, pipes or sump, the water will be removed from the sump by vacuum truck and the trench, pipes and sump will be flushed with water to remove residual spill material. Soap or other cleaning materials may be used in the cleaning operation depending of the type of material that was spilled. All wash water will be contained and removed using the vacuum truck. The recovered water will be tested as necessary to determine the proper disposal procedure.

The pump station discharges to Pond 190. The pump must be turned on manually after checking the water in the pump station to insure that the water does not contain spillage from the HHW storage area. The pump shut offs automatically once the water level in the sump reaches the low level setting. Prior to discharging water from the pump station, the water in the pump station will be checked for color, odor, phase separation and other signs that spilled material may have entered the pump station. Specific conductance and pH will be checked in the water in the pump station. If there is a possibility that spilled material has entered the pump station, the water will be removed from the pump station by vacuum truck and the trench, pipes, sump and pump station will be flushed with water to remove residual spill material. Soap or other cleaning materials may be used in the cleaning operation depending of the type of material that was spilled. All wash water will be contained and removed using the vacuum truck. The recovered water will be tested as necessary to determine the proper disposal procedure.

Attachment C
Sample Load Checking Inspection Form

CITRUS COUNTY WASTE COLLECTION AND DISPOSAL
CITRUS COUNTY CODE, CHAPTER 82, SECTION 101
VEHICLE INSPECTION CHECKLIST

COLLECTOR'S NAME: _____ COUNTY ID NO: _____

VEHICLE: _____

TYPE SIZE VEHICLE ID NO.

_____

YEAR MAKE LICENSE NO.

INSPECTED BY: _____ for SWM.

		YES	NO
1.	Collectors name and phone no. properly displayed.	____	____
2.	Vehicle identification no. properly displayed. (Co. ID# & Truck # located on drivers side door & front bumper)	____	____
3.	Vehicle reasonably water tight.	____	____
4.	Solid metal sides with covered metal top	____	____
5.	Vehicle uniformly painted & reasonably clean	____	____
6.	Back up alarm operational	____	____
7.	Fire extinguisher and triangles in vehicle	____	____
8.	Proof of Insurance/Registration in vehicle	____	____
9.	Tarp provided for roll-off vehicle	____	____
10.	Securing system for roll-off vehicles (tie down straps/hooks)	____	____
11.	Waste Tire Transporter Decal, if applicable	____	____
12.	VEHICLE IN COMPLIANCE	____	____

If No, explanation or re-inspection list:

_____

DATE: _____ TARE WEIGHT: _____

RE-INSPECTION DATE (if applicable): _____

FOR ITEM NUMBER(s): _____

_____

Information entered into Auto Scale 2000 (date & initials) _____

Bar Code Label printed (date and initials) _____

White Copy: Landfill Office
Yellow Copy: Driver Inspection complete
Pink Copy: Driver Re-inspection needed

Attachment D
Maintenance Summary Form

Equipment Number:	20316 826H Compactor	9314 Pan Scraper	20154 Roll-off Mileage	20426 R/A Loader
	20041 Dump Truck	20433 D6T Dozer	20164 826G Compactor	20427 Cell Loader
OPERATOR DAILY CHECKS	9300 Dump Truck	20248 J/D Tractor	20033 J/D Mower	20315 Workman
	20249 Slope Mower			
& SERVICES	WEEK OF:		TO:	

	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday	
Daily Walk Around Inspection												
Beginning Hours												
Refuel Hours												
Ending Hours												
Fuel Added, Gallons												
Check / Top-off Engine Oil												
Check Coolant Level / Radiator												
Check Hydraulic Oil Level												
Check Transmission Oil Level												
Check Drivetrain For Leaks												
Remove Debris From Pinch Areas												
LUBRICATE every 10 hours												
Drain Fuel Filter Water Seperator												
Backup Alarm & Fire Extinguisher												
Clean Windows and Cab Interior												
Quick Coupler and Tire Pressure												
Check / Clean Cab Fresh Air Filter												
Clean Primary Engine Air Cleaner												
Initials												

Operator Comments:

"Have you greased and cleaned " YOUR " machine lately"

Total Hours Operated		Next Service Due	
Total Fuel Used			
Gallons Per Hour		Posted	

Attachment E
Leachate Collection System
Inspection Report

LEACHATE COLLECTION SYSTEM
INSPECTION FORM

Name of Facility: Citrus County Transfer Station **Week Beginning:**

Address of Facility: 230 West Gulf to Lake Highway, Lecanto, FL 34461

Phone: 352-527-7670

	Mon	Tues	Wed	Thurs	Fri	Sat
Floor Drains Clean						
High Level Alarm Operating						
Pumps Running Properly						
Pipes and Fittings Not Leaking						
Floats Clean and Operable						
Valve Vault Drain Clean						
Telemetry System Operating						
Flow Meter Total Reading (gal)						
Inspected By: (Initials)						

Comments:

Attachment I
Technical Specifications

TABLE OF CONTENTS

SPECIAL CONDITIONS

01340 Shop Drawings, Product Data, Working Drawings and Samples
01700 Completion, Start-up and Closeout
02200 Site Preparation
02240 Dewatering
02315 Excavation
02316 Fill and Backfill
02319 Subgrade Preparation
02320 Trench Backfill
02350 Water Mains & Appurtenances
02351 Water Valves & Appurtenances
02355 Packaged Potable Water Pumping System
02356 Potable Water Pump System Enclosure
02357 Packaged Diesel-Driven, Centrifugal Fire Pump System
02428 Gravity Wastewater Sewers & Appurtenances
02429 Wastewater Force Mains & Appurtenances
02450 Gravity Leachate Sewer Collection System & Force Main
02451 Duplex Submersible Leachate Pump Station
02455 Duplex Submersible Sewage Pump Station
02456 Aerobic Drip Tape Septic System
03300 Cast-In-Place Concrete
11150 Knuckleboom Crane
13110 Truck Scales and Accessories
13850 Fire Detection and Alarm
13930 Fire Suppression Sprinkler System
13931 High Expansion Foam (HEF) Fire Protection System
15484 Diesel Fuel Tank System

- **Revised specs included**
- Specs not included in RAI#1 Resubmittal (No Changes)

SPECIAL CONDITIONS

1.0 Construction Phasing

The County landfill, Customer Service Area (CSA) and all other associated on-site facilities must remain in operation throughout construction of this project. The site modifications shall be executed in a phased approach to facilitate continuous operation during the construction of the new CSA, transfer station, scale house and related works. The CONTRACTOR shall be responsible for planning the interfaces between construction phases.

The CONTRACTOR shall be responsible for all temporary drainage during the phased construction. Temporary drainage systems shall avoid puddling and flooding of active areas of the site. Temporary ponds/silt fences/sediment basins shall be constructed to control sediment and prevent migration from the site. Any discharge from the site during construction shall meet state standards.

As part of his project submittals, the CONTRACTOR shall develop and submit for approval a Phasing Plan. A potential outline and general approach for the phasing plan is as follows:

Phase I: Construction and modifications required to place the new transfer station, scale facility, CSA and Recycling Center into operation including:

- Selected demolition;
- Filling and grading;
- Construction of the temporary scrap metal and appliance pad at the existing CSA;
- Construction of the temporary yard waste processing facility;
- Improvements to the secondary entrance and the new 24-hour Recycling Center.
- New scales facility, less the existing scales to be relocated during Phase II;
- Transfer station building including ramps and tunnel;
- New CSA and Household Hazardous Waste (HHW) facility;
- Relocation of one existing diesel fuel tank to the new fuel island;
- New Trailer Staging Area;
- New Electrical Service including Transformers, Electrical Building, Diesel Generator and new fuel tanks;
- Associated Road and Drainage Improvements;
- Domestic wastewater treatment and disposal system;
- Domestic and fire water lines to the new transfer station and scale buildings, including booster pump stations;
- Leachate pump station, force main and modifications to the existing leachate pump station.

Phase II:

- New dry storage building;
- Demolition of the Existing CSA walls;

- Relocation of the existing scales to the new scale facility;
- Demolition of the Existing Scalehouse;
- Relocation of the remaining existing diesel fuel tank to the new fuel island;
- Demolition of the existing CSA pad and construction of the new Yard Waste Processing Facility;
- Remaining site and pavement modifications;
- All other items required to complete the project.

The CONTRACTOR shall cooperate fully with COUNTY staff to maintain traffic flow and full operations during both phases of the project. Specific areas of attention include, but are not limited to, the following:

A. Phase I

1. Throughout Phase I, the existing facilities shall remain in operation with no interruptions. Access to and around the existing CSA, scalehouse and landfill will be required not only for customers but also for County vehicles and haulers and recycling vehicles. Access must be provided for County vehicles to remove and replace rolloff containers at the CSA and to transport those containers to the landfill.

B. Phase II

1. The existing scale facility, CSA and HHW must remain in service until the new scale facility, transfer station, CSA and HHW are placed into service. Placing these facilities into service will require the following:

   a. Preliminary and final walkthroughs and startup testing are conducted with the COUNTY and the ENGINEER and all punch list items are addressed;

   b. All Building Department Certificates of Occupancy are issued;

   c. The CONTRACTOR provides accurate and complete As-Built drawings for the completed work;

   d. Submittal of Certification of Construction Completion Documentation, inspections by Florida Department of Environmental Protection (FDEP) representatives are completed and the FDEP issues a Letter of Clearance to place the new facilities into operation;

   e. Once the FDEP issues a Letter of Clearance to place the new facilities into operation, the COUNTY will issue a Certificate of Beneficial Occupancy for those facilities.

   The CONTRACTOR'S schedule shall allow for a period of 120 calendar days from the date the ENGINEER accepts the CONTRACTOR'S As-

Built drawings as being complete to the date the COUNTY is able to issue a Certificate of Beneficial Occupancy. Submission of incomplete or inaccurate As-Built drawings on the CONTRACTOR'S part shall not be a source for claims for loss of time or additional compensation. If, through no fault of the CONTRACTOR, FDEP delays in issuing a Letter of Clearance result in the 120 calendar day time period specified above being exceeded, the County will extend the contract time with no increase in contract cost.

2. During the time period discussed in 1. above, work on the remainder of the project may proceed, including work in Phase II, provided that the existing facilities remain in operation at all times. Should the COUNTY determine that the CONTRACTOR'S work creates conditions that are hazardous for the public or COUNTY employees, the COUNTY reserves the right to stop the CONTRACTOR'S work, at no additional cost or contract time, until said conditions are corrected.

3. The CONTRACTOR shall provide the required temporary roads and maintenance of traffic to maintain facility operations at all times. Temporary roads for trucks, when required, shall be a minimum of twelve (12) feet wide.

The CONTRACTOR shall note that the site is open for use by the public. Safe access for the public and for COUNTY employees must be maintained at all times.

2.0 Demolition Works and Recycling

A. The CONTRACTOR shall be responsible for demolishing, removing and disposing of all facilities identified as being demolished and part of the contract.

B. As part of the COUNTY's continuing efforts to promote recycling, as a minimum, all steel and concrete demolition debris shall be disposed of at an appropriate recycling facility. If the concrete or steel is contaminated, this debris shall be disposed of at an appropriate disposal facility. The CONTRACTOR shall include the associated cost or credit in his prices.

3.0 Septic System Abandonment Requirements

A. The approximate location of the existing scale house septic system is shown on the Drawings. The CONTRACTOR is responsible for the complete demolition, removal and disposal of this system. The system shall not be abandoned until the scale facility is taken out of service.

B. Abandonment of the septic system shall include, but may not be limited to the following:

1. The septic tank shall be pumped out by a state licensed Septic System Contractor.

2. The septic tank shall be flushed with clean water and then pumped out by a state licensed Septic System Contractor.
3. The septic tank and drainfield shall be completely removed and disposed of.
4. The CONTRACTOR shall call the Citrus County Health Department to schedule an inspection.

C. The CONTRACTOR is responsible for obtaining a Citrus County Health Department Septic Tank Abandonment Permit prior to the demolition of the systems.

4.0 Geotechnical Studies

A. Geotechnical studies have been completed by CH2M HILL. Geotechnical studies provided to the Contractors herein are for informational purposes only and the County does not warrant or guarantee the contents, accuracy, or adequacy of the information.

B. The CONTRACTOR is welcome to perform additional geotechnical studies at the sites which they deem necessary to prepare pricing.

5.0 Materials Testing

A. The COUNTY will bear all costs associated with materials testing. All tests shall be conducted by a Florida Certified Laboratory in accordance with the specifications. The CONTRACTOR is responsible for all coordination and scheduling of testing.

B. All on-site sampling and materials testing shall be in the presence of the COUNTY or its designated representative. A copy of all sampling and materials testing/analysis reports shall be submitted to the COUNTY and the ENGINEER. All sampling and materials testing laboratories shall be approved by the COUNTY. All sampling and materials testing locations shall be approved by the COUNTY.

C. The CONTRACTOR shall hire an independent laboratory to perform testing per AWS D1.1. on the transfer station steel headed anchor stud welds. Reports of testing shall be provided to the ENGINEER and the County.

D. The CONTRACTOR is responsible for all coordinating all materials testing as listed in the individual specifications and as required to verify the work. The following represents minimum site materials testing requirements and in no way relieves the CONTRACTOR from performing testing required by the technical specifications but not listed below.

1. Fill and Backfill: As specified in Section 02316, paragraph 3.04.

2. Subgrade: As specified in Section 02319, paragraph 3.04.

3. Pipe Trench Backfill: A minimum of one compaction test for each lift for every 300 feet of pipe constructed.

4. Pavement Stabilized Subgrade: Three density and Limerock Bearing Ratio (LBR) tests for every 5,000 square feet of pavement.

5. Pavement Limerock Base:

   a. Density and LBR tests as specified in in the FDOT Standard Specifications for Road and Bridge Construction or three density tests for every 5,000 square feet of pavement, whichever is more frequent.

   b. Thickness tests as specified in in the FDOT Standard Specifications for Road and Bridge Construction or one boring for every 5,000 square feet of pavement. Borings shall be taken by the Contractor's testing lab and not the COUNTY.

6. Asphalt Pavement:

   a. Asphalt temperatures for each truck delivered.

   b. Marshall Stability and Flow (Marshal mix only): Four each, staggered throughout project asphalt delivery.

   c. Extractions and Gradation: Five each for Marshall mix, staggered throughout project asphalt delivery.

   d. Density tests: Per in the FDOT Standard Specifications for Road and Bridge Construction except that one "lot" shall be considered 5,000 square feet of pavement.

   e. Thickness tests: One test for every 5,000 square feet of pavement. Borings shall be taken by the Contractor's testing lab and not the COUNTY.

7. Concrete:

   a. Slump test on each truck of concrete delivered.

   b. One set of three (3) compressive strength cylinder tests for every 50 yards of concrete delivered, or one for each day's delivery, whichever is greater.

6.0 Permits

A. The following permits have been or are being obtained by the COUNTY These permits include:

1. FDEP Environmental Resource Permit.
2. FDEP Solid Waste Management Facility Permit.
3. FDOT Driveway Permit.
4. FDOT Drainage Permit.
5. U.S. Army Corps of Engineers Nationwide Permit.
6. Citrus County DRC Approval.
7. FDEP General Permit to construct an extension to a Public Water Supply Distribution System.

The Contractor's licensed septic system contractor shall obtain the required Health Department Permits for abandonment of the existing scale house septic system and for construction of the new septic system.

CONTRACTORS are advised to become familiar with and to comply with the conditions of the provided permits. Any discrepancies discovered between the permit conditions and the Contract Documents shall immediately be brought to the ENGINEER'S attention.

7.0 Utility Coordination

A. The CONTRACTOR shall coordinate with power and telephone companies regarding removal and relocation of electrical and telephone services and for the relocation of existing poles as required.

B. All existing utility lines to the existing scale house and administration building, including County data lines, must remain in service until the existing scale house is demolished and the new utility lines to the Administration building and new scale house are placed into service.

8.0 Miscellaneous Clarifications

1. The Contractor will be provided with electronic drawings in AutoCad format.

2. Section 13930, Fire Suppression Sprinkler System, is a performance specification. The fire sprinkler sub-contractor is required to provide drawings and hydraulic calculations based on the specifications.

-END OF SECTION -

SECTION 01340
SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the Engineer for review such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this Section called data), and material samples (hereinafter in this Section called samples) as are required for the proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

B. The Contractor shall note that there are specific submittal requirements in other sections of these Specifications.

1.02 SHOP DRAWINGS

A. When used in the Contract Documents, the term "shop drawings" shall be considered to mean Contractor's Drawings for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, bills of material, wiring and control diagrams, and inspection and test reports including performance curves and certifications as applicable to the Work.

B. All details on shop drawings submitted for review shall show clearly the elevations of the various parts to the main members and lines of the structure and/or equipment, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the shop drawings before being submitted for review.

C. See Shop Drawing Schedule requirements in Subparagraph 1.07 CONTRACTOR'S RESPONSIBILITY.

1.03 PRODUCT DATA

A. Product data as specified in individual sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturers product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing storage instructions, and printed product warranties, as applicable to the work.

1.04 WORKING DRAWINGS

A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's Drawings for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.

B. Working drawings shall be signed and sealed by a registered Professional Engineer, currently licensed to practice in the State and shall convey, or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer. Such review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor. The Owner and Engineer shall have no responsibility for errors on the working drawings or the finished work.

1.05 SAMPLES

A. The Contractor shall furnish, for review of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed and in quantities and sizes as specified. A minimum of two samples of each item shall be submitted unless otherwise specified. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until reviewed by the Engineer.

B. Samples specified in individual sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.

C. The Contractor shall prepare a transmittal letter for each shipment of samples. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Review of a sample shall be only for the characteristics or use named in such review and shall not be construed to change or modify any Contract requirements.

1.06 SUBMITTAL REQUIREMENTS

A. The Contractor shall review, approve, and submit, with reasonable promptness and in such sequence, so as to cause no delay in the Contract Work or in the Work of the

Owner or any separate contractor, all shop drawings, product data, working drawings and samples required by the Contract Documents.

B. The Contractor shall submit a minimum of seven (7) copies of descriptive or product data submittals and shop drawings to the Engineer for distribution as follows:

- Four (4) to remain with the Engineer
- One (1) for the Owner
- Two (2) for return to the Contractor

Shop Drawings submitted in addition to seven (7) will be returned to the Contractor. The Engineer will review the submittal and return to the Contractor marked-up copies of the shop drawings with the appropriate review comments.

C. Shop drawings, product data, working drawings and samples shall be furnished with the following information:

1. Number and title of the drawing.

2. Date of drawing or revision.

3. Name of project building, facility or system.

4. Name of contractor, subcontractor, and manufacturer submitting drawing.

5. Clear identification of contents, location of the work, and the sheet numbers where the product is found in the contract drawings.

6. Contractor Certification Statement.

7. Submittal Identification Number.

8. Contract Drawing Number Reference.

D. All items specified are not necessarily intended to be a manufacturer's standard product. Variations from specified items will be considered on an "or equal" basis. If submittals show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal and on the shop drawings along with notification of his intent to seek contract adjustment. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed. Variations submitted but not described may be cause for rejection. Any variations initiated by the Contractor will not be considered as an addition to the scope of work unless specifically noted and then approved as such in writing by the Engineer.

E. Data on materials and equipment shall include materials and equipment lists giving, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, material, size, finish and all other pertinent data.

F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained. In addition, a maintenance and lubrication schedule for each piece of equipment shall be submitted as specified in Section 01730.

G. The Contractor shall use the color "green" to make his remarks on the Submittals. Only the Engineer will utilize the color "red" in marking submittals.

1.07 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check, and coordinate with the work of all trades, all drawings, data, schedules and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of any drawing or data sheet larger than 11"x17" shall bear Contractor's stamp showing that they have been so checked and approved. Drawings or data sheets 11"x17" and smaller shall be bound together in an orderly fashion and bear the Contractor's stamp on the cover sheet. The cover sheet shall fully describe the packaged data and include a list of all sheet numbers within the package. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor, without review at the Engineer's option, for conformance with this requirement.

B. The Contractor shall review shop drawings, product data, and samples prior to submission to determine and verify the following:

1. Field measurements.

2. Field construction criteria.

3. Manufacturer's catalog numbers and similar data.

4. Conformance with Specifications.

C. Shop drawings shall indicate any deviations in the submittal from the requirements of the Contract Documents.

D. The Contractor shall furnish the Engineer a Shop Drawing schedule fixing the respective dates for the initial submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall be provided as a separate entity and indicate those submittals that are critical to the progress schedule. The Contractor shall prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by

processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit complete and acceptable submittals sufficiently in advance of the Work.

E. The Contractor shall not begin any work affected by a submittal returned, "Rejected. Revise as indicated and resubmit". Before starting this work all revisions must be corrected by the Contractor. After resubmittal they will be reviewed and returned to him by the Engineer. If returned marked, "No exceptions noted" or "Exceptions as noted", then the Contractor may begin this work. Any corrections made to the shop drawings are to be followed without exception.

F. The Contractor shall submit to the Engineer all shop drawings and data sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for review from the time the Engineer receives them.

G. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to review by the Engineer of the necessary shop drawings.

H. All shop drawings, product data, working drawings and samples submitted by subcontractors for review shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission according to the approved shop drawing schedule so as to prevent delays in delivery of materials and project completion.

I. The Contractor shall check all subcontractor's shop drawings, product data, working drawings and samples regarding measurements, size of members, materials, and details to satisfy himself that they are in conformance to the Contract Documents. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission to the Engineer.

1.08 ENGINEER'S REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The Engineer's review is for general conformance with the design concept and contract drawings. Markings or comments shall not be construed as relieving the Contractor from compliance with the Contract Drawings and Specifications or from departures there from. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

B. The review of shop drawings, data, and samples will be general. They shall not be construed:

1. As permitting any departure from the Contract requirements;

2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

C. If the shop drawings, data or samples as submitted describe variations per subparagraph (1.07H), and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the Contractor under one of the following:

"NO EXCEPTIONS NOTED." is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

"EXCEPTIONS AS NOTED." is assigned when notations or comments have been made on the submittal pointing out minor discrepancies as compared with the Contract Documents. Resubmittal or confirmation is not necessary prior to release for manufacturing.

"EXCEPTIONS AS NOTED/CONFIRM." This combination of codes is assigned when a confirmation of the notations and comments is required from the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation is to address the omissions and/or nonconforming items that were noted. Only the items to be "confirmed" need to be resubmitted.

"EXCEPTIONS AS NOTED/RESUBMIT." This combination of codes is assigned when a resubmittal is required by the Contractor. The Contractor may release a portion of the equipment or material for manufacture; however, all notations and comments must be incorporated into the final submittal. This resubmittal is to address the omissions and/or nonconforming items that were noted.

"REJECTED. REVISE AS INDICATED AND RESUBMIT." This combination of codes is assigned when the submittal is in noncompliance with the Contract Documents and must be corrected and the entire package resubmitted. This code generally means that the equipment or material cannot be released for manufacture unless the Contractor takes full responsibility for providing the submitted items in accordance with Contract Documents.

"FOR YOUR INFORMATION." is assigned when the package provides information of a general nature that may or may not require a response.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing, on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.

F. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven (7) working days prior to release for manufacture.

G. The Engineer will review a submittal/resubmittal a maximum of two (2) times after which cost of review will be borne by the Contractor. The cost of engineering shall be equal to the Engineer's charges to the Owner under the terms of the Engineer's agreement with the Owner.

H. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

I. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01700
COMPLETION, START-UP AND CLOSEOUT

PART I - GENERAL

1.01 COMPLETION PROCEDURES

A. Substantial Completion is defined in the General Conditions. When the Contractor believes Substantial Completion has been achieved, Contractor shall request, in writing, to the Project Manager, that Substantial Completion be recognized as having been achieved and request that the County issue a Certificate of Substantial Completion. Prior to making such a request, the Contractor must have:

1. Completed all work necessary for the safe, proper and complete use or operation of the facility as intended.
2. Prepared a Contractor-generated punch list for submission with the request for issuance of a Certificate of Substantial Completion.
3. Submitted for and received acceptance of accurate record drawings for all work completed to date.
4. Submitted and received acceptance of all specified warranties, guarantees and operation and maintenance manuals.
5. Completed all required vendor training, testing, and where required, start-up.
6. Delivered all required spare parts.

B. Upon receipt of the request from the Contractor, the Project Manager and designated representatives shall review the request, the work and the above requirements to determine whether the Contractor has achieved Substantial Completion. If this review fails to support Substantial Completion, the Project Manager shall so notify the Contractor in writing citing the reasons for rejection. If the Project Manager determines the Contractor has reached Substantial Completion, the following procedures will be followed:

1. The Project Manager, his/her representative and user representatives will review the work and the Contractor's punch list to assure all deficiencies are noted on a final punch list.
2. The Project Manager will schedule and conduct a pre-final walk-through of the facility with representatives of the County user department, Capital Projects Department, the Professional, the Contractor and others, for the purpose of formally reviewing the work, the final punch list and the readiness of the Project for use. A copy of the final punch list will be provided to all participants and any additional items noted during the walk-through will be added to the list.
3. Upon completion of the pre-final walk-through the Project Manager shall prepare a Certificate of Substantial Completion establishing the date for Substantial Completion as the date of the walk-through, provided the walk-through has verified that the Project is in fact ready for use and

occupancy by the County for its intended purpose. Upon issuance of this certificate by the Project Manager the facility will be considered Substantially Complete.

C. Final Completion will be deemed to have occurred when all work is completed including the following:
   1. All final punch list items have been corrected, signed off by the Contractor and the Project Manager's representative, and demonstrated to the County during a final walk through.
   2. All updates to the record drawings, and operations and maintenance manuals have been made.
   3. Demobilization and site clean up are complete.
   4. The Project Manager has issued a Certificate of Final Completion.
   5. The requirements specified under Article 15 of the General Conditions have been met.
   6. All facilities and/or equipment have been properly demonstrated to be functioning as required.

D. Beneficial Occupancy will normally not occur before Substantial Completion but can occur for a discrete element of a project when desired by the County. When Beneficial Occupancy is requested, the same procedure specified for substantial completion will be used. Upon completion of the procedure, the County will accept occupancy of that element of work.

1.02 START-UP PROCEDURES

A. Contractor is responsible for the complete test, check out, start-up and commissioning of all elements of the project. The Contractor shall verify these activities through daily inspection reports, test records, on-site vendor certifications and by other appropriate means. The test and start-up requirements below are complementary to those specified elsewhere in the Contract Documents.
   1. Component test and check out is the verification that each component of the work is in compliance with the Contract Documents, and is ready to perform its intended function.
   2. Sub-system test and start-up is the verification that a discrete group of related components is functioning as intended within itself and is ready to perform its intended function in the overall system.
   3. System test and start-up is the operation and verification that all related components and sub-systems are functioning as intended and are ready for final commissioning and operation.
   4. Commissioning is placing a complete system or project into service.

B. Contractor shall conduct all test, check out and start-up requirements specified in the Contract Documents and provide documentation of same to the County prior to commissioning. Where vendor on-site inspections are required prior to or

during start-up, the Contractor shall require vendor to provide a written statement that the installation and check out is complete and proper and that the item(s) are ready for start-up and/or commissioning.

1.03 CLOSE-OUT PROCEDURE

A. Project Manager and Contractor shall meet and resolve all outstanding issues including, but not limited to:
   1. Claims and adjustments for time or costs
   2. Outstanding, unused allowances
   3. Procedures for handling warranty issues

B. A Final Change Order shall be processed if required. Final payment and close out procedures shall comply the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 BASIS OF PAYMENT

The cost of all work associated with this section is to be incorporated with the appropriate pay items of this contract.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02200
SITE PREPARATION

PART 1 GENERAL

1.01 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2-inch caliper to a depth of 6 inches below subgrade.

D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.

E. Stripping: Removal of topsoil remaining after applicable scalping is completed.

F. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 QUALITY ASSURANCE

A. Obtain Engineer's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.03 SCHEDULING AND SEQUENCING

A. Prepare Site only after adequate erosion and sediment controls are in-place. Limit areas exposed uncontrolled to erosion during installation of temporary erosion and sediment controls to maximum of 1.0 acre.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Grab and remove all trees within the limit of ~~landfill~~ Project shown on Drawings.

B. Clear, grub, and strip areas actually needed for site grading, trench excavation, borrow, or site improvements within limits shown or specified.

C. Do not injure or deface vegetation that is not designated for removal.

3.02 LIMITS

A. As follows, but not to extend beyond Project limits.

1. Within ~~Landfill~~ Project Limit: Grub all trees.
2. Site Grading Area: 5 feet from the edge of grading.
3. Utility Trench Excavation: 5 feet from trench centerline, regardless of actual trench width.
4. Stockpile Area:
   a. Clearing and Grubbing: 5 feet beyond toe of stockpile.
   b. Stripping: 2 feet beyond toe of stockpile.
5. Structures: 10 feet outside of new structures.
6. Overhead Utilities:
   a. Clearing and Grubbing: Entire width of easements and rights-of-way.
7. Other Areas: As shown.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 CLEARING

A. Clear areas within limits shown or specified.

B. Fell trees so that they fall away from facilities and vegetation not designated for removal.

C. Cut stumps not designated for grubbing flush with ground surface.

D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

E. No stumps, roots or perishable matter shall remain under concrete slabs or footings, or contained in pipeline trenches or other excavations.

3.04 GRUBBING

A. Grub all trees within the limit of ~~landfill~~ Project as shown on Drawings.

B. Grub areas within limits shown or specified, or designated by Engineer.

3.05 SCALPING

A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.

B. Scalp areas within limits shown, specified, or Engineer.

3.06 STRIPPING

A. Do not remove topsoil until after scalping is completed.

B. Strip areas within limits to minimum 6 inches deep, or designated by Engineer. Do not remove subsoil with topsoil.

C. Stockpile strippings for topsoil, separately from other excavated material.

3.07 TREE REMOVAL OUTSIDE CLEARING AND GRUBBING LIMITS

A. Remove within Project Limits:

1. Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling.
2. Trees designated by Engineer.

B. Cut stumps off flush with ground, remove debris, and if disturbed, restore surrounding area to its original condition.

3.08 DISPOSAL

A. Clearing and Grubbing Debris:

1. Dispose of debris consisting of tree roots and construction debris at an approved ~~offsite facility~~ properly permitted construction and demolition disposal facility.
2. Burning of debris onsite will not be allowed.
3. All trees, brush, logs, leaves, sawdust, bark, excess excavation, and refuse shall be collected and transported to, and deposited in, a legal refuse disposal landfill or other approved material stockpile areas.
4. Debris shall be removed from the site as soon as practical and debris shall not be left on site for more than 5 working days and shall not be left to accumulate until the completion of the job.
5. The Contractor shall obtain and pay for any and all permits required thereof.
6. If the Contractor should fail to do this, Citrus County will make the necessary arrangements to effect the clean up by others and will back charge the costs to the Contractor. If such action becomes necessary on the part of and in the opinion of Citrus County, Citrus County will not be responsible for the inadvertent removal of material which the Contractor would not have disposed of had he effected the required clean-up.

B. Scalpings: As specified for clearing and grubbing debris.

C. Strippings:

1. Dispose of strippings that are unsuitable for topsoil or that exceed quantity required for topsoil offsite.
2. Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

3.09 DISTURBANCES TO EXISTING IMPROVEMENT

A. The Contractor shall prepare videotape of the proposed construction area prior to commencing construction. A copy of the videotape shall be delivered to the Citrus County Solid Waste Department, prior to commencement of construction.

B. The Contractor will be responsible for protection and preservation of existing improvements including necessary removal and storage of such improvements and subsequent replacement to obtain to the fullest extent possible, the undisturbed condition.

C. Best Management Practices for erosion control shall be installed and maintained continuously by the contractor during progress of the work in compliance with Local, State, and Federal Regulations. Where material or debris has washed or eroded into or been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the process of the work, and the ditches, channels, drains, etc. kept in a clean and neat condition. Environmental compliance is the Contractor's responsibility at all times.

D. The Contractor shall restore or replace, when and as directed, any public or private property damaged by its work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of its operations. To this end the Contractor shall perform as required all necessary highway, driveway, walk or landscaping, etc. Suitable materials, equipment and methods shall be used in such restoration.

END OF SECTION

SECTION 02240
DEWATERING

PART 1 GENERAL

1.01 SUBMITTALS

A. Quality Control Submittals: Copies of any authorization and permits required to perform work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall be responsible for design, installation, and operation of a dewatering system to keep excavations free of water.

B. Remove and control water during periods when necessary to properly accomplish Work.

3.02 SURFACE WATER CONTROL

A. Remove surface runoff controls when no longer needed.

3.03 DEWATERING SYSTEMS

A. Contractor shall design, furnish, install, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry conditions and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.

B. For excavations and trenches dewatering systems shall include wells or well points, and other equipment and appurtenances installed outside limits of excavations and sufficiently below lowest point of excavation, or to maintain specified groundwater elevation.

C. Design and Operate Dewatering Systems:

1. To prevent loss of ground as water is removed.
2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.

3.04 DISPOSAL OF WATER

A. Obtain discharge permit for water disposal from authorities having jurisdiction.

B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.

C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.

D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

3.05 WELL POINT REMOVAL

A. After removing the well point dewatering system, well point holes shall be filled with sand which shall be washed into the hole. Well point holes located in asphalt payment surfaces or concrete pavements, shall be filled with sand to the subgrade, the remaining portion of holes shall be filled with nonshrink grout.

END OF SECTION

SECTION 02315
EXCAVATION

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Provide adequate survey control to avoid unauthorized overexcavation.

B. Monitor potential adverse impacts on adjacent facilities and completed work.

1.02 WEATHER LIMITATIONS

A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.03 SEQUENCING AND SCHEDULING

A. Clearing, Grubbing, and Stripping: Complete applicable Work specified in Section 02200, Site Preparation, prior to excavating.

B. Dewatering: Conform to applicable requirements of Section 02240, Dewatering, prior to initiating excavation.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

B. Do not overexcavate without written authorization of Engineer.

C. If over excavation occurs, in the event the Contractor through error, or otherwise, excavates below the elevation required, the Contractor shall at its own expense backfill with AASHTO Class A-3 soil or granular backfill, if approved by the Engineer, and compact to obtain a suitable pipe bedding or structure support as defined in the specifications.

D. Conduct excavation in accordance with OSHA Standards 29CFR Part 1926.650 Subpart P. Trenching and Excavation regulations and requirements.

3.02 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.03 TRENCH WIDTH

A. Minimum Width of Trenches:

1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
   a. Less than 4-inch Outside Diameter or Width: 18 inches.
   b. Four-Inch and Greater Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank or as shown on Drawings.
2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between them, as shown on Drawings.

B. The maximum Trench width for pipes is as shown on Drawings.

3.04 EMBANKMENT AND CUT SLOPES

A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.

B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.

C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.

3.05 STOCKPILING EXCAVATED MATERIAL

A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.

B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.

C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.

D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.06 DISPOSAL OF SPOIL

A. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 02200, Site Preparation, for clearing and grubbing debris.

3.07 DUST CONTROL

A. If, in the opinion of the Engineer, it is necessary to control dust from time to time during the progress of the work, the Contractor shall do so with no additional compensation.

END OF SECTION

SECTION 02316
FILL AND BACKFILL

PART 1 GENERAL

1.01 DEFINITIONS

A. Relative Compaction:

1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D1557.
2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.

B. Optimum Moisture Content:

1. Determined in accordance with ASTM Standard specified to determine maximum dry density for relative compaction.
2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.

C. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, stripping of topsoil, excavation to grade, and subgrade preparation.

D. Completed Course: A course or layer that is ready for next layer or next phase of Work.

E. Lift: Loose (uncompacted) layer of material.

F. Well-Graded:

1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

G. Influence Area: Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:

1. 1-foot outside outermost edge at base of foundations or slabs.
2. 1-foot outside outermost edge at surface of roadways or shoulder.
3. 0.5-foot outside exterior at spring line of pipes or culverts.

H. Imported Material: Materials obtained from sources offsite, suitable for specified use.

I. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specific use.

J. Structural Fill: Fill materials as required under structures, pavements, and other facilities.

1.02 SUBMITTALS

A. Samples: Imported material taken at source.

B. Information Submittals: Certified test results from independent testing agency.

1.03 QUALITY ASSURANCE

A. Notify Engineer when:

1. Structure is ready for backfilling, and whenever backfilling operations are resumed after a period of inactivity.
2. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.
3. Fill material appears to be deviating from Specifications.

1.04 SEQUENCING AND SCHEDULING

A. Complete applicable Work specified in Sections 02200, Site Preparation; 02315, Excavation, and 02319, Subgrade Preparation, prior to placing fill or backfill.

B. Backfill against concrete structures only after concrete has attained compressive strength, specified in Section 03300, Cast-In-Place Concrete. Obtain Engineer's acceptance of concrete work and attained strength prior to placing backfill.

C. Backfill around water holding structures only after completion of satisfactory leakage tests as specified in Section 03300, Cast-In-Place Concrete.

D. Do not place granular base, subbase, or surfacing until after subgrade has been prepared as specified in Section 02319, Subgrade Preparation.

PART 2 PRODUCTS

2.01 SOURCE QUALITY CONTROL

A. Gradation Tests: By Contractor's testing laboratory, as necessary to locate acceptable sources of imported material.

B. Samples: Collected in accordance with ASTM D75:

1. During production of imported material, provide samples of granular fill.

2.02 EARTHFILL

A. Excavated material from required excavations free from rocks larger than 2 inches in diameter, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

B. Where materials unsuitable for backfill are excavated within the limits of excavation shown on the drawings, and as directed by the Engineer, the unsuitable material shall be removed from the job site and disposed of by the Contractor. If the stockpiled suitable excavated material is insufficient, suitable Class A-3 soil shall be provided to replace the unsuitable materials, with measurement and payment made on the basis of unit price set forth in the Contract for Class A-3 soil. In no event shall amount of measurement exceed the quantity defined in Measurement and Payment or authorized to be excavated by the Engineer.

C. Unsuitable material shall include AASHTO M 145, Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7, peat and other highly organic soil, pile foundations, concrete, railroad tracks, debris, muck, clay, rock, large clods, stones, wood, stumps, roots or other deleterious material, etc. All unsuitable materials must be verified by the Engineer prior to removal and replacement.

2.03 GRANULAR FILL

A. One-inch minus crushed rock or sand.

B. Free from dirt, clay balls, and organic material. Free from organic material shall be interpreted as less then or equal to 2.5 percent organic material by weight and containing no roots with caliper greater then ½ inch.

C. Well-graded from coarse to fine and containing sufficient fines to bind material when compacted, but with maximum 8 percent by weight passing No. 200 sieve.

2.04 AASHTO CLASS A-3 SOIL BACKFILL

A. The Contractor shall furnish, place, and compact AASHTO Class A-3 soil, free of organic or other suitable material for backfill or bedding as specified herein, in authorized excavation above or below normal grade and in other locations as indicated on the drawings, or as specified, and where ordered by the Engineer for miscellaneous backfill.

2.05 WATER FOR MOISTURE CONDITIONING

A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

PART 3 EXECUTION

3.01 GENERAL

A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.

B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.

C. During filling and backfilling, keep level of fill and backfill around each structure even.

D. If Pipe, Conduit, Duct Bank, or Cable is to be Laid within Fill or Backfill:

1. Fill or backfill to an elevation 2 feet above top of item to be laid.
2. Excavate trench for installation of item.
3. Install bedding, if applicable, as specified in Section 02320, Trench Backfill.
4. Install item.
5. Backfill envelope zone and remaining trench, as specified in Section 02320, Trench Backfill, before resuming filling or backfilling specified in this Section.

E. Tolerances:

1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.

F. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

3.02 BACKFILL UNDER AND AROUND STRUCTURES

A. Within influence area beneath structures, slabs, pavements, curbs, trenches for piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.

B. Backfilling shall be accomplished as soon as practical after underground work on the structure is completed. No trash shall be allowed to accumulate in the space to be backfilled. Particular care shall be taken to avoid leaving wood where it will be buried. The space to be backfilled shall be well cleaned before backfilling commences.

C. Other Areas: Backfill with earthfill to lines and grades shown, with proper allowance for topsoil thickness where shown. Place in lifts of 8-inch maximum thickness and compact each lift to minimum 90 percent relative compaction as determined in accordance with ASTM D1557.

D. Ground surface shall be restored to the elevation shown on the Drawings, which generally will conform to the undisturbed surface.

3.03 FILL

A. Outside influence areas and not beneath structures, pavements, curbs, slabs, piping, and other facilities: Unless otherwise shown, place earthfill as follows:

1. Allow for 4-inch thickness of topsoil where required.
2. Maximum 8-inch thick lifts.
3. Place and compact fill across full width of embankment.
4. Compact to minimum 90 percent relative compaction as determined in accordance with ASTM D1557.
5. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.04 SITE TESTING

A. Gradation:

1. One sample from each 6,000 tons of finished product or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.
2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
3. Remove material placed in Work that does not meet Specification requirements.

B. In-Place Density Tests: In accordance with ASTM D2922. During placement of materials, test as follows:

1. Granular Fill and Earthfill: One test for every 7,000 square feet of each lift; or one test per lift, whichever requires more tests.
2. Density test reports shall be submitted to the Owner or his representative for approval, in duplicate, within 72 hours of the test. Test reports shall be transmitted directly from the laboratory to the Engineer and Citrus County. Test reports shall be identified by the project title, project number, project location and location and depth of each on-site test submitted.

C. The Contractor shall provide and pay an independent testing laboratory conforming to the requirements of ASTM D3740 to make in-place density tests of excavation backfill as specified herein and as located by the Owner or his representative. The testing laboratory is subject to the approval of the Engineer.

D. Any failed test shall be re-tested at the Contractor's expense.

3.05 REPLACING OVEREXCAVATED MATERIAL

A. Replace excavation carried below grade lines shown or established by Engineer as follows:

1. Beneath Footings: Granular fill.
2. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.
3. Beneath Slabs-On-Grade: Granular fill.
4. Trenches:
   a. Unauthorized Overexcavation: Granular fill or AASHTO Class A-3 Soil.
   b. Authorized Overexcavation: Granular fill.
5. Permanent Cut Slopes (Where Overlying Area is Not to Receive Fill or Backfill):
   a. Flat to Moderate Steep Slopes (3 to 1, Horizontal Run: Vertical Rise or Flatter): Earthfill.
   b. Steep Slopes (Steeper than 3 to 1):
      1) Correct overexcavation by transitioning between overcut areas and designed slope adjoining areas, provided such cutting does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.
      2) Backfilling overexcavated areas is prohibited, unless in Engineer's opinion, backfill will remain stable, and overexcavated material is replaced as compacted earthfill.

END OF SECTION

SECTION 02319
SUBGRADE PREPARATION

PART 1 GENERAL

1.01 DEFINITIONS

A. Optimum Moisture Content: As defined in Section 02316, Fill and Backfill.

B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.

C. Relative Compaction: As defined in Section 02316, Fill and Backfill.

D. Subgrade: Layer of existing soil after completion of clearing, grubbing, roadway structure or base for floor slab.

E. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.02 SEQUENCING AND SCHEDULING

A. Complete applicable Work specified in Section 02200, Site Preparation and Section 02315, Excavation, prior to subgrade preparation.

1.03 QUALITY ASSURANCE

A. Notify Engineer when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

1.04 REFERENCE

A. FDOT SSRBC: "Standard Specifications for Road and Bridge Construction," State of Florida, Department of Transportation, - Latest Edition, including all amendments.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.

B. Bring subgrade to proper grade and cross-section and uniformly compact surface.

C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.

D. Maintain prepared ground surface in finished condition until next course is placed.

E. Stabilized Subgrade under pavement sections shall be installed in accordance with FDOT SSRBC.

3.02 COMPACTION

A. Under the Proposed Scale House:

1. Overexcavate the loose sand to 4 feet below the bottom of footings or slabs and to 5 feet beyond the footprint of the building. Stock-pile the overexcavated sand nearby.
2. Proof roll the excavation bottom with at least 15 overlapping passes using a 10-ton or heavier vibratory roller. Compact the upper 12 inches of excavation bottom to at least 95 percent of the maximum dry density as determined by ASTM D1557.
3. Place the stock-piled sand back in excavation pit in 8-inch lifts and compact each lift to 95 percent of the maximum dry density as determined by ASTM D1557. Place the compacted soil to the bottom of the base slab elevations.

B. Under the Proposed Transfer Building:

1. Over-excavate the undisturbed soil to the same bottom elevation of the borrow pit. The overexcavation should be extended to 20 feet beyond the footprint of the building. Stock-pile the over-excavated soil nearby.
2. Proof roll the excavation and borrow pit bottom with at least 15 overlapping passes using a 10-ton or heavier vibratory roller. Compact the upper 12 inches of excavation bottom to at least 95 percent of the maximum dry density as determined by ASTM D1557.
3. Place imported and the stock-piled sand back in excavation pit in 8-inch lifts and compact each lift to 95 percent of the maximum dry density as determined by ASTM D1557. Place the compacted soil to the bottom of the base slab elevations.

C. Under Earthfill: Compact upper 12 inches to minimum of 90 percent relative compaction as determined in accordance with ASTM D1557.

D. Under Pavement Structure, Floor Slabs, or Granular Fill Under Structures: Proof roll the subgrade with at least 15 overlapping passes using a vibratory roller having a minimum dynamic force of 10 tons. After proof rolling, compact the upper 12 inches to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.

3.03 MOISTURE CONDITIONING

A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.

B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process. Allow material to dry until reading the proper moisture content for the specified compaction.

3.04 TESTING

A. The Contractor shall retain an independent soil testing company to determine in-place density and moisture content.

B. One test per every 7,000 square feet on every lift of subgrade; or one test per lift, whichever requires more tests.

3.05 CORRECTION

A. Soft or Loose Subgrade:

1. Adjust moisture content and recompact.
2. Over excavate as specified in Section 02315, Excavation, and replace with suitable material from the excavation, as specified in Section 02316, Fill and Backfill.

B. Unsuitable Material: Over excavate as specified in Section 02315, Excavation, and replace with suitable material from the excavation, as specified in Section 02316, Fill and Backfill.

END OF SECTION

SECTION 02320
TRENCH BACKFILL

PART 1 GENERAL

1.01 DEFINITIONS

A. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.

B. Imported Material: Material obtained by Contractor from source(s) offsite.

C. Lift: Loose (uncompacted) layer of material.

D. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.

E. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.

F. Selected Backfill Material: Material available onsite that Engineer determines to be suitable for a specific use.

G. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

1.02 SUBMITTALS

A. Shop Drawings: Manufacturer's descriptive literature for marking tapes.

B. Quality Control Submittals:

1. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to Site.

PART 2 PRODUCTS

2.01 MARKING TAPE

A. Plastic:

1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
2. Thickness: Minimum 5 mils.
3. Width: Minimum 3 inches.
4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
5. Manufacturers and Products:
   a. Reef Industries; Terra Tape.
   b. Mutual Industries; Nondetectable Tape.
   c. Presco; Nondetectable Tape.

B. Metallic:

1. Solid aluminum foil, visible on unprinted side, encased in protective high visibility, inert polyethylene plastic jacket.
2. Foil Thickness: Minimum 0.35 mils.
3. Laminate Thickness: Minimum 5 mils.
4. Width: Minimum 3 inches.
5. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
6. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
7. Manufacturers and Products:
   a. Reef Industries; Terra Tape, Sentry Line Detectable.
   b. Mutual Industries; Detectable Tape.
   c. Presco; Detectable Tape.

C. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

Color[a]	Facility
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Potable water
Purple	Reclaimed water, irrigation and slurry lines
[a]As specified in ANSI Z53.1, Safety Color Code.	

2.02 TRENCH STABILIZATION MATERIAL

A. Granular Fill: As specified in Section 02316, Fill and Backfill.

2.03 BEDDING MATERIAL AND PIPE ZONE MATERIAL

A. Friable, and no clay balls, roots, or other organic material.

B. Granular Fill: As specified in Section 02316, Fill and Backfill.

2.04 EARTH BACKFILL

A. Earthfill: As specified in Section 02316, Fill and Backfill.

2.05 SOURCE QUALITY CONTROL

A. Contractor's testing laboratory to perform gradation analysis in accordance with ASTM C136.

PART 3 EXECUTION

3.01 TRENCH PREPARATION

A. Water Control:

1. Promptly remove and dispose of water entering trench in accordance with Section 02240, Dewatering, as necessary to grade trench bottom and to compact backfill and install manholes, pipe, conduit, direct-buried cable, or duct bank. Do not place concrete, lay pipe, conduit, direct-buried cable, or duct bank in water.
2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
3. Provide continuous water control until trench backfill is complete.

B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

3.02 TRENCH BOTTOM

A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.

B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Engineer. Engineer will determine depth of overexcavation, if any required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

A. Rebuild trench bottom with trench stabilization material.

B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.

C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

A. Furnish imported bedding material where, in the opinion of Engineer, excavated material is unsuitable for bedding or insufficient in quantity.

B. Place over the full width of the prepared trench bottom in two equal lifts when the required depth exceeds 8 inches.

C. Hand grade and compact each lift to provide a firm, unyielding surface.

D. Minimum Thickness: As follows:

1. Pipe, 15 Inches and Smaller: 4 inches.
2. Pipe, 18 Inches to 36 Inches: 6 inches.
3. Pipe, 42 Inches and Larger: 8 inches.
4. Conduit: 4 inches.
5. Direct-Buried Cable: 4 inches.
6. Duct Banks: 4 inches.

E. Check grade and correct irregularities in bedding material. Loosen top 1 to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.

F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.

G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

A. Upper Limit of Pipe Zone shall Not be Less than Following:

1. Pipe: 12 inches, unless shown otherwise.
2. Conduit: 3 inches, unless shown otherwise.
3. Direct-Buried Cable: 3 inches, unless shown otherwise.
4. Duct Bank: 3 inches, unless shown otherwise.

B. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.

C. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench.

1. Pipe 10-Inch and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter.
2. Pipe Over 10-Inch Diameter: Maximum 6-inch lifts.

D. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by "walking in" and slicing material under haunches with a shovel to ensure that voids are completely filled before placing each succeeding lift.

E. After the full depth of the pipe zone material has been placed as specified, compact the material by a minimum of three passes with a vibratory plate compactor only over the area between the sides of the pipe and the trench walls. Compact the material to at least 95 percent of the maximum dry density as determined by ASTM D1557.

F. Do not use power-driven impact compactors to compact pipe zone material.

3.06 MARKING TAPE INSTALLATION

A. Continuously install marking tape along centerline of all buried piping, on top of last lift of pipe zone material. Coordinate with piping installation drawings.

1. Metallic Marking Tape: Install with nonmetallic piping and waterlines.
2. Plastic Marking Tape: Install with metallic piping.

3.07 BACKFILL ABOVE PIPE ZONE

A. General:

1. Process excavated material to meet specified gradation requirements.
2. Adjust moisture content as necessary to obtain specified compaction.
3. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.
4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
6. Backfill around structures with same class backfill as specified for adjacent trench unless otherwise shown or specified.

B. Backfill Areas to be Seeded:

1. Place earth backfill in lifts not exceeding 8-inch thickness.
2. Mechanically compact each lift to a minimum of 90 percent of the maximum dry density as determined by ASTM D1557 prior to placing succeeding lifts.

C. Backfill for Areas Under Facilities and Asphalt or Portland Concrete Paving: Backfill trench above pipe zone with granular fill in lifts not to exceed 6 inches. Compact each lift to a minimum of 95 percent relative compaction prior to placing succeeding lifts.

3.08 REPLACEMENT OF TOPSOIL

A. Replace topsoil in top 4 inches of backfilled trench.

B. Maintain the finished grade of topsoil even with adjacent area and grade as necessary to restore drainage.

3.09 MAINTENANCE OF TRENCH BACKFILL

A. After each section of trench is backfilled, maintain the surface of the backfilled trench even with the adjacent ground surface until final surface restoration is completed.

B. Topsoil: Add topsoil where applicable and as necessary to maintain the surface of the backfilled trench level with the adjacent ground surface.

C. Asphaltic Pavement: Replace settled areas or fill with asphalt as specified for asphalt concrete pavement.

D. Other Areas: Add excavated material where applicable and keep the surface of the backfilled trench level with the adjacent ground surface.

3.10 SITE TESTING

A. Gradation:

1. One sample from each 150 tons of finished product or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.
2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
3. Remove material placed in Work that does not meet Specification requirements.

B. In-Place Density Tests: In accordance with ASTM D2922. During placement of materials, test as follows:

1. Granular Fill and Pipe Zone Fill: One test for every 300 feet of each lift; or one test per lift, whichever requires more tests.

3.11 SETTLEMENT OF BACKFILL

A. Settlement of trench backfill, or of fill, or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill.

END OF SECTION

SECTION 02350
WATER MAINS & APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The Contractor shall furnish and install a potable water piping system, complete, tested and ready for operation.

B. The work shall also include such connections, reconnections, temporary service and all other provisions in regard to the existing operation and modification as is required to perform the new work.

C. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated.

D. Only those materials included in the Approved Materials and Equipment list shall be installed unless otherwise specified or directed.

E. All materials shall be new unless specifically called for otherwise.

1.02 SECTION INCLUDES:

A. Furnishing and installing water piping

B. Furnishing and installing fittings

C. Furnishing and installing jointing material

D. Furnishing and installing restrained joints

E. Furnishing and installing piping accessories

1.03 REFERENCED SECTIONS:

A. Section 02315 - Excavation and Earthwork

B. Section 02320 – Trench Backfill

C. Section 02351 - Water Valves and Appurtenances

D. Section 02352 - Water System Agency Clearance

E. Section 03300 - Cast-in-Place Concrete

1.04 REFERENCES:

A. AWWA – C104, C105, C110, C111, C115, C150, C151, C153, C206, C207, C600, C605, C651, C800, C900, C901, C905, C907 & M23.

B. AWWA/ANSI – C110.

C. ANSI – A21.10, A21.11, A21.15, A21.4, A21.50, A21.51, A21.53, B16 & B16.1.

D. ASTM – A193, A194, A240, A380, A536, D1248, D1598, D1599, D1784, D1785, D2000, D2122, D2239, D2241, D2564, D2672, D2737, D2837, D2855, D3139, D3350 & F477.

E. CCDWR MSCSWE: Citrus County Department of Water Resources, Utilities Division "Minimum Standards & Construction Specifications For Water & Wastewater Systems", Latest Edition, including all amendments.

F. FDOT SSRBC: "Standard Specifications for Road and Bridge Construction", State of Florida, Department of Transportation, - Latest Edition, including all amendments.

G. UD: Citrus County, Department of Water Resources, Utilities Division.

1.05 SHOP DRAWING SUBMITTALS:

A. Actual catalog data, brochures and descriptive literature will not be required for items of standard usage which meet the requirements of these specifications and are listed in the Approved Materials and Equipment List.

B. Any specialty item not shown in the Water and Sewer Approved Materials and Equipment List will require a complete shop drawing submittal.

C. The Engineer may at any time require the Contractor to provide a complete detailed shop drawing submittal for any material, which may, in the Engineer's opinion, not be in compliance with these specifications.

1.06 QUALITY ASSURANCE:

A. Qualifications
1. During the last seven years, the pipe manufacturer shall have successfully designed, fabricated, and installed pipe and liner for at least 20 projects of similar scope and dollar value as the project specified in this Contract. Each installation shall have been in service for a minimum of five years.

1.07 DELIVERY, STORAGE AND HANDLING:

A. Packing and Shipping:
1. Ship pipe to site with wood lagging between pipes to prevent contact of pipe surfaces.
2. Pack fittings, jointing materials and piping accessories in suitable containers to prevent damage when shipped to site.

B. Acceptance at Site:
1. Carefully examine pipe and related materials delivered to site for defects and compliance with specifications.

2. Reject all defective pipe, fittings, and materials and remove from site.
3. Seal ends of pipe and fittings with dust-tight cover before shipment to prevent foreign matter entering pipe and fittings.

C. Storage and Protection:
1. Store pipe, fittings and accessories in protected areas on site to prevent damage and weathering before installation.
2. Prevent damage to pipe, fittings and accessories during unloading and storage.
3. Do not handle pipe find fittings by hooks inserted in ends.
4. Replace pipe and fittings in which lining has been damaged. Repair small and readily accessible damage to the lining when acceptable to the ENGINEER.
5. Repair damaged exterior coatings before installation of pipe, fitting, or accessory.
6. Store joint lubricant in closed containers and keep clean.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Ductile Iron Pipe and Fittings
1. American Ductile Iron Pipe Company
2. Griffin Pipe Products Company
3. United States Pipe & Foundry Company
4. Or Approved Equal

2.02 MATERIALS:

A. All material shall be free from defects impairing strength and durability, shall be of the best commercial quality for the purpose specified, and shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

2.03 GENERAL:

A. Pipe for potable water lines in sizes up to and including 48 inches shall be ductile iron, or polyvinyl chloride (PVC) as shown on the drawings and as herein specified.

B. Pipe for potable water lines larger than 48 inches shall be ductile iron.

C. Pipe to be used as a casing in sizes 4 inches and larger shall be welded steel pipe as shown on the drawings and as herein specified.

D. Pipe to be installed underground shall be push-on joint type.

E. Pipe installed on bridges, piles or other above ground installations shall be restrained joint, ductile iron pipe or flanged ductile iron pipe as described in these specifications.

F. PVC pipe shall not be used in above ground applications.

G. Underground pipe shall be furnished in nominal 18 or 20 foot laying lengths unless indicated otherwise on the drawings.

H. All pipe shall be NSF approved for use with potable water.

I. Pipe shall be cut to length as required to fit installation conditions. Pipe sizes and applications shall conform to the following chart.

PIPE	PIPE SIZE	JOINT TYPE	APPLICATION
Ductile Iron	3 inches and larger	Mechanical joint, push-on joint, flanged joint, ball joint, etc.	water mains and services-3" for services only
PVC DR14, DR18	4 inches through 48 inches	Push-on joint	water mains and services
SCH 40 PVC	2 inches only	Solvent Weld	where shown on the drawings
SCH 80 PVC	2 inches only	Solvent Weld	where shown on the drawings
SDR 21 PVC	2 inches and smaller	Push-on joint	where shown on the drawings
Polyethylene Tubing	2 inches and smaller	No joints in pipe	services only

2.04 DUCTILE IRON PIPE:

A. Ductile iron pipe wall thickness and pressure class shall conform to ANSI Specification ANSI A21.50 (AWWA C150) and ANSI A21.51 (AWWA C151) with pressure class 350 as a minimum.

B. Pipe shall also be certified by ISO 9000 by an accredited registrar.

C. Each length shall be clearly marked with the name of the manufacturer, location of the foundry, pressure rating, thickness or pressure class, nominal pipe diameter, weight of pipe without lining and length.

D. All pipe furnished by the manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data.

E. All ductile iron pipe shall be externally coated and internally lined as specified in this section.

F. All ductile iron pipe shall be color coded blue by field painting a blue stripe, 3 inches wide, along the crown of the pipe barrel.

2.05 POLYVINYL CHLORIDE PRESSURE PIPE:

A. Pipe shall be virgin polyvinyl chloride (PVC) pipe for potable water and shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3139.

B. Elastomeric seals shall meet ASTM F477.

C. The pipe material shall be clean, virgin, National Sanitation Foundation No. 14 approved, Class 12454-A or 12454-B PVC compound conforming to ASTM resin specification D1784.

D. Each length shall be clearly marked with the name of the manufacturer, location of the plant, pressure rating, nominal pipe diameter and length.

E. Storage and handling of PVC pipe shall be in accordance with chapter 6 of AWWA Manual M23.

F. All PVC water pipe shall be blue.

G. PVC pipe shall conform to the following:
   1. PVC 1120, CLASS 235, DR 18 PIPE
      a. Pipe shall conform to AWWA Standard C900 for 4-inch through 12-inch pipe, and AWWA Standard C905 for 14-inch through 36-inch pipe.
      b. All pipe shall be hydrostatically proof tested at the factory in conformance with UNI-B-11 standards.
      c. In case of conflict between standards specified herein, the requirements of AWWA Standard C900 and C905 shall prevail.
      d. Pipe is to be manufactured to ductile iron pipe equivalent outside diameters.
      e. The pipe shall be designed to pass without failure a sustained pressure test of 500 psi in conformance with ASTM D1598 and a quick burst test of 755 psi in conformance with ASTM D1599.
   2. PVC 1120, CLASS 305, DR 14 PIPE
      a. Pipe shall conform to AWWA Standard C900 for 6-inch through 12-inch pipe, and AWWA Standard C905 for 14-inch through 36-inch pipe.
      b. All pipe shall be hydrostatically proof tested at the factory in conformance with UNI-B-11 standards.
      c. In case of conflict between standards specific herein, the requirements of AWWA Standard C900 and C905 shall prevail.
      d. Pipe is to be manufactured to ductile iron pipe equivalent outside diameters.
      e. The pipe shall be designed to pass without failure a sustained pressure test of 650 psi in conformance with ASTM D1598 and a quick burst test of 985 psi in conformance with ASTM D1599.
   3. PVC 1120, PR200, SDR21 PIPE
      a. Pipe shall conform to ASTM D2241 and shall be used where shown on the plans.
      b. Pipe is to be manufactured to I.P.S. (Steel) Standard Pipe equivalent outside diameters.
      c. The pipe shall be designed for a hydrostatic working pressure of 200 psi at 73.4 degrees F and to pass without failure a sustained pressure test of 420 psi minimum when tested in accordance with ASTM D1598, and a quick burst test of 630 psi minimum when tested in accordance with ASTM D1599.
      d. Pipe shall be marked NSF-PW approved.

4. PVC 1120, SCHEDULE 40 AND SCHEDULE 80 PIPE
   a. Pipe shall conform to ASTM D1784 and D1785 and shall be used only where shown on the plans.
   b. Pipe is to be manufactured to I.P.S. (Steel) Standard Pipe equivalent outside diameters.
   c. The sustained pressure test shall be conducted in accordance with ASTM D1598 at test pressure given in ASTM D1785.
   d. The burst pressure test shall be conducted in accordance with ASTM D1599 at test pressures given in ASTM D1785.
   e. Pipe shall be marked NSF-PW approved.

2.06 SERVICE LINES:

A. POLYETHYLENE TUBING
   1. All services 2 inches and smaller shall be polyethylene tubing unless otherwise shown on the drawings. Tubing shall be manufactured of PE 3408, High Density Polyethylene (HDPE), in accordance with AWWA C901, ASTM D1248, ASTM D2239, ASTM D2737 and ASTM D3350.
   2. The tubing shall have a minimum working pressure of 200 psi.
   3. Polyethylene tubing shall be copper tube size SODR9 and shall be colored blue.
   4. HDPE pipe shall have ultraviolet (UV) inhibitors for protection against direct sunlight for 4 years.
   5. Inserts for polyethylene tubing shall be 316 stainless steel.
   6. Tubing shall be approved for use with potable water by the National Sanitation Foundation (NSF14) and shall be continuously marked at intervals of not more than two feet with the following:
      a. Nominal size
      b. Pressure rating
      c. NSF seal
      d. Manufacturer's name or trademark
      e. Standard dimension ratio
      f. ASTM specification

2.07 FITTINGS:

A. Fittings shall have joints that match the type of pipe furnished except as otherwise specified.

B. Fittings on 2-inch PVC pipe may be restrained pressure rated PVC with push-on bell type joint or solvent weld.

C. Fittings 3-inches and larger on push-on joint pipe for underground PVC and DIP mains shall be ductile iron class 350 through 12-inch and class 250 in sizes 16-inch and larger (short body type).

D. The fitting joints shall be restrained as necessary to prevent movement of pipe or appurtenances in response to thrust. The restraints may be in the form of concrete thrust blocks (as shown in Detail No. 111-12) or mechanical and push-on joint restraints (as specified in Sub-Section 2.08K depending on the design requirements.

E. The fittings shall be cement lined and sealed the same as ductile iron pipe in accordance with AWWA/ANSI C110 latest revision.

F. Long body fittings may be used where the drawings specifically call for them, where compact fittings are not available, or at the option of the Contractor when the laying length is not controlled by compact fitting patterns.

G. Fittings 3-inches and larger installed aboveground shall be ductile iron with flanged ends or restrained joints unless shown otherwise on the drawings.

H. Fittings for fire hydrant laterals shall be ductile iron, including tee to lateral.

I. DUCTILE IRON FITTINGS:
1. Ductile iron fittings shall have a minimum working pressure of 250 psi.
2. Fittings shall conform to ANSI Specification A21.10 (AWWA C110), A21.11 (AWWA C111), A21.15 (AWWA C115) and/or A21.53 (AWWA C153). Fittings shall also be certified by ISO 9000 by an accredited registrar.
3. Compact fittings shall normally be installed.
4. Long body fittings shall be used where the drawings specifically call for long body fittings, where compact fittings are not available, or at the option of the Contractor when the laying length is not controlled by compact fitting patterns.
5. All fittings shall be UL/FM approved and shall conform to NSF Standard 61 as applicable.
6. All fittings furnished by the approved manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data.
7. Fittings shall have cast on them the pressure rating, nominal diameter of openings, manufacturer's name, foundry location, plant code and degrees or fraction of the circle.
8. Cast letters and figures shall be on the outside body of the fitting.
9. All ductile iron fittings shall be externally coated and internally lined as specified in this section.

J. POLYVINYL CHLORIDE FITTINGS:
1. Fittings that are 2-inch may be PVC with push-on bell type joint or PVC with solvent weld joints as outlined in the chart of Sub-section 2.03 of this specification.
2. Fittings that are 4-inch and larger shall be push on bell joint. Restraints shall be in accordance with this specification regarding installation and material.
3. The fittings shall conform to the appropriate sections of these specifications for PVC pipe and PVC pipe joints.
   a. PVC 1120, Class 150, DR18 Fittings
      i. PVC fittings 4-inch through 8-inch may be used with PVC C900 pipe.
      ii. Fittings shall be PVC injection molded, made from materials meeting or exceeding the requirements of cell class 12454-B material as defined in ASTM D1784.
      iii. All PVC fittings must comply with, or exceed, AWWA C907.
      iv. All fittings must he designed to the pressure class of DR18, with a minimum pressure rating of 150 psi and a 2.5 to 1 factor of safety.
      v. Virgin materials only shall be used in the manufacture of PVC pressure fittings. These fittings must have UL-FM approval and shall comply with or exceed all ASTM Standards for PVC fittings.

vi. All fittings must have NSF-61 approval.
vii. The elastomeric gasket shall comply with the requirements specified in ASTM F477.

b. PVC 1120, SDR21, Fittings:
i. SDR21 fittings shall be injection molded, push on bell type with elastomeric rubber seals in accordance with ASTM D3139.
ii. Seals shall conform to ASTM F477.

c. PVC 1120, Schedule 40 and Schedule 80 Fittings
i. Schedule 40 and schedule 80 fittings shall have solvent weld joints and shall be in accordance with ASTM D2672.

d. Polyethylene Fittings:
i. All polyethylene fittings shall comply with NSF-14 requirements.
ii. All fittings and couplings shall be thermoplastic nylon 6/6 material suitable for working pressure of 200 psi.
iii. Joints on all thermoplastic fittings shall be compression type with 360-degree restraint or threaded as required for a complete installation.

K. NONSTANDARD FITTINGS AND WALL CASTINGS:
1. Fittings having nonstandard dimensions and cast specifically for project shall be of approved design. They shall be manufactured to meet the requirements of the same specifications and shall have the same diameter and thickness as standard fittings, but their laying lengths and types of ends shall be determined by their positions in the pipelines and by the particular piping to which they connect.
2. Wall castings shall be of the size and types indicated on the drawings.
3. Flanges, facing, and drilling shall conform to the 125-pound American National Standard.
4. Flanges shall be drilled and tapped for studs.
5. Other dimensions shall be substantially equal to corresponding parts of standard bell and spigot fittings.

L. TAPPING SLEEVES – STAINLESS STEEL:
1. Stainless steel tapping sleeves may be used on 4-inch pipe and larger.
2. Stainless steel tapping sleeves shall be all 304 stainless steel, including flanges, bolts and nuts and shall be rated for 150-psi minimum operating pressure and 200 psi minimum test pressure.
3. The tapping sleeve shall have a pilot flange recessed for tapping per MSS SP-60.
4. The pilot flange shall be pressure rated Class D according to AWWA C207 with 125 pound drilling conforming to ANSI B16.
5. Each sleeve shall be supplied with a flange gasket bonded to the flange.
6. The body gasket shall be a full circle, grid pattern, covering the entire length of the sleeve, cloth reinforced, with attached stainless steel bridge to support the gasket at the lugs.
7. The gasket shall be made of SBR rubber or similar material, compounded for use with water, salt solution, mild acids, bases and sewage.
8. The sleeve shall have a 3/4-inch NPT bronze or stainless steel test plug.
9. All welds shall conform to ASTM A380 and shall be fully passivated.

2.08 JOINTS:

A. Type of joint used shall be approved by the Engineer prior to installation.

B. Joints shall be made in accordance with approved printed instructions of the manufacturer, and shall be absolutely watertight.

C. MECHANICAL JOINTS:
1. All jointing materials for mechanical joints shall be provided by the pipe and/or fitting manufacturer.
2. Material assembly and bolting shall be in accordance with ANSI Specification A21.11 (AWWA C111).
3. All glands shall be made of ductile iron only.

D. PUSH-ON JOINTS:
1. DUCTILE IRON
   a. Push-on joints shall be in accordance with ANSI Specification A21.11 (AWWA C111).
   b. All joint material shall be provided by the pipe manufacturer and installation shall be in accordance with the manufacturer's recommended practice.
2. POLYVINYL CHLORIDE (PVC)
   a. PVC pipe joints shall be the manufacturer's standard push-on bell type with rubber sealing ring in accordance with ASTM D3139.
   b. Elastomeric gaskets shall conform to ASTM F477.

E. BALL AND SOCKET JOINTS:
1. Where sub-aqueous joints are indicated, joints shall be bolted or boltless flexible ball and socket joints conforming to the pressure and thickness requirements of ANSI A21.11 (AWWA C110) and ANSI A21.51 (AWWA C151) and shall be capable of providing a maximum deflection of fifteen degrees at each joint. Joints and gasket material shall be manufacturer's standard.
2. The specific type joint shall be as shown on the drawings and/or as approved by the Engineer.
3. Installation shall be in accordance with the manufacturer's recommended practice.

F. FLANGED JOINTS:
1. Ductile iron flanged joints shall conform to ANSI A21.10 (AWWA C110) and ANSI A21.15 (AWWA C115).
2. Flanges shall be in accordance with ANSI Specification B16.1, Class 125 with any special drilling and tapping as required to insure correct alignment and bolting.
3. Screwed flanges shall be screwed in tight at the foundry by machine before they are faced and drilled.
4. Flanges for flanged joints and flanged specials shall be integrally cast at right angles to the axis, accurately faced, and drilled smooth and true.
5. Gaskets shall be rubber ring type, cloth inserted, minimum thickness of 1/8 inch and shall be used on all flanges.

6. The entire gasket, including the retainer and sealing ring, shall be one continuous piece.
7. Retainers glued together will not be accepted.
8. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped.
9. The number and size of bolts shall conform to the same ANSI standard as the flanges.
10. Bolts and nuts shall be of Grade B conforming to the ASTM Specifications for steel machine bolts and nuts and tap bolts, designation A307.
11. Bolt studs shall be of the same quality as machine bolts. Bolts shall be tightened so as to distribute evenly the stress in the bolts and bring the pipe in alignment.
12. The Contractor shall provide suitable fitting rings where the layout of the flange piping is such as to necessitate their use. In materials, workmanship, facing and drilling, such rings shall conform to ANSI B16.1 Class 125.

G. MACHINED SURFACES:
1. Machined surfaces shall be cleaned and coated with a suitable rust preventive coating at the shop immediately after being machined.

H. STEEL CASING PIPE JOINTS:
1. Steel casing pipe joints shall be electric fusion (arc) welded by operators whose qualifications meet the requirements of the American Welding Society Standard procedures and in conformance with AWWA C206.

I. POLYVINYL CHLORIDE SOLVENT WELD JOINTS:
1. Pipe joints for schedule 40 or schedule 80 pipe shall be solvent weld joints. The solvent cement shall comply with ASTM D2564.
2. The joint shall be made in accordance with ASTM D2855. The joint shall conform to ASTM D2672.

J. POLYETHYLENE JOINTS:
1. Polyethylene joints shall be butt-fused, done with polyethylene fittings or brass compression fittings.

K. RESTRAINED JOINTS:
1. RESTRAINERS
   a. The restrainer shall be manufactured of ductile iron and shall meet or exceed all the requirements of ANSI A21.11 (AWWA C111) and ASTM A536.
   b. The restrainer system shall provide anchoring of PVC pipe to mechanical joint fittings or bell to spigot PVC pipe joints.
   c. Restraints shall provide a full 360 degree contact with sufficient gripping action to secure the clamp to the pipe and be designed so that restraint action is increased as a result of increases in line pressure.
   d. The restrainer shall accommodate the full working pressure rating of the pipe plus surge allowance.
2. RETAINER GLANDS
   a. Retainer glands shall be manufactured of ductile iron grade 64-42-10, ASTM A536 or pre-approved equal and shall be designed to fit standard mechanical joint bells conforming to applicable sections of ANSI A21.10

(AWWA C110), ANSI A21.11 (AWWA C111) and ANSI A21.53 (AWWA C153).

b. The restraining device shall be rated for the full working pressure of the pipe type used including surge allowance and a 2:1 safety factor.
c. Mechanical restraints shall include a restraining mechanism which, when actuated, imparts a wedging action against the pipe, increasing its resistance as the pressure increases.
d. The restraint shall be compatible with the type of joint being installed.
e. The joint deflection shall not exceed 80% of the pipe manufacturer's recommended maximum deflection.
f. Deflection, if necessary shall be made before tightening the set screws.
g. Bolts and setscrews shall be tightened alternately, 180 degrees apart, to the torque recommended by the manufacturer.
h. Retainer glands having set screws that make point contact with the pipe without using a pad to disperse point loading shall not be used on PVC pipe.
i. The restraining device shall not damage or lower the working pressure of the pipe installed.

L. FLANGE ADAPTERS:
1. Flange adapters shall be ductile iron manufactured to ASTM A536 standards.
2. Bolt circles and bolt holes shall meet ANSI B16.1 for 125 pounds.
3. Adapter flanges shall meet or exceed all test requirements of AWWA C900, ASTM D2241 and ASTM D1599.

M. PIPE COUPLINGS:
1. The Contractor shall furnish and install pipe couplings as required to complete the work.
2. Pipe couplings used to join two pieces of ductile iron pipe or PVC pipe shall be sized to match the outside diameter of the pipeline.
3. Transition couplings shall be used to join pipes of different outside diameters.
4. The coupling sleeve shall be manufactured of ductile iron conforming to ASTM A536 and be coated with 14 mils of epoxy.
5. The bolts shall be manufactured of a metal of high corrosion resistance and shall conform to ANSI A21.11 (AWWA C111).
6. Gaskets shall be wedge-type and manufactured of virgin SBR for water and sewer service.
7. The installation of all couplings shall be in accordance with manufacturer's recommendations.
8. After installation, all coupling surfaces including bolts and nuts shall be coated with an approved coating as specified in this section of these specifications.
9. Couplers and adapters for polyethylene pipe shall be brass conforming to AWWA C800 and shall be female IPT, pack joint or compression nut.

N. FULL CIRCLE REPAIR CLAMPS:
1. Full circle repair clamps shall have type 304 stainless steel shell, lugs, bolts, nuts and washelrs as per ASTM A193, A194, A240, or shall have type 304 stainless steel shell per ASTM A240, ductile iron lugs as per ASTM A536, and 304 stainless steel bolts, washers and nuts.
2. Gaskets for both types shall be virgin SBR as per ASTM D2000 for water and sewer service.

2.09 CORROSION PROTECTION FOR DUCTILE IRON PIPE:

A. INTERIOR LINING
1. The interior of all ductile iron pipe, fittings and specials shall be thin cement lined.
2. The lining shall comply with ANSI Standard A21.4 (AWWA C104).

B. EXTERIOR COATING
1. All ductile iron pipe and fittings, except on bridges or as otherwise noted, shall receive an exterior bituminous coating as specified in ANSI A21.51.
2. The finished coating shall be continuous smooth, neither brittle when cold nor sticky when exposed to the sun, and be strongly adherent to the fitting.
3. All bolts, nuts, studs and other uncoated parts of joints for underground installation shall be coated with asphalt or coal tar prior to backfitting.
4. Pipes crossing under ditches, culverts, rivers, creeks, etc. shall be considered as buried pipe.
5. All ductile iron pipe shall be color coded blue by field painting a blue stripe, 3 inches wide, along the crown of the pipe barrel.

C. POLYETHYLENE WRAP
1. In areas where soils are corrosive in nature, as may be determined by the Engineer, ductile iron pipe, fittings, valves and other appurtenances shall be protected with polyethylene wrap or tubing.
2. The Contractor shall furnish and install polyethylene tube or wrap for ductile iron pipe at the locations shown on the construction drawings.
3. MATERIAL
   a. The polyethylene material shall meet or exceed the requirements of AWWA C105 in all respects.
   b. The wrap shall be virgin, high-density polyethylene, 4 mils thick minimum.
   c. The polyethylene wrap shall be white with 2 each, 6-inch wide, continuous blue tapes located at the 2:00 and 10:00 o'clock position on the pipe.
4. INSTALLATION
   a. Although not intended to be a water-tight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill.
   b. Installation shall be done according to one of the methods described in AWWA C105, subject to approval by the Engineer and the manufacturer.

2.10 PIPING SUPPORTS:

A. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the drawings or as specified.

B. Piping within pumping stations shall be adequately supported from floors, walls, ceilings or beams.

C. Supports from the floor shall be by suitable concrete piers as indicated or approved.

D. Concrete piers shall conform accurately to the bottom one-third to one-half of the pipe.

E. Piping along walls shall be supported by approved stainless steel wall brackets.

F. Supports shall be located wherever necessary, and in no case shall they exceed 8 feet on centers for ductile iron pipe and 4 feet on centers for PVC pipe.

2.11 LOCATE WIRING:

A. Locate wiring shall be 10 gauge, single strand, UF rated (direct burial), copper wire.

B. Plastic ties for connecting to water main shall be plastic, zipper type ties.

C. Ground clamps shall be bronze serrated heads with brass-bronze screws.

D. Wire connectors shall be PinPoint wire connected by Dura-Line or pre-approved equal.

2.12 MATERIAL WARRANTY:

A. The manufacturer of any materials or equipment furnished on a project shall supply to Utilities Division (UD), a one- (1) year unconditional warranty.

B. The warranty shall be limited to the material or equipment, which shall constitute complete replacement and delivery to the site.

C. This warranty is in addition to any warranty required for pipe linings herein before specified.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. REFERENCE POINTS AND LAYOUT
1. The Contractor shall be responsible for setting all grade, lines and levels.
2. The Contractor or Contractor's Surveyor will provide centerline of construction and will establish a benchmark.
3. Any reference points, points of intersection, property corners, or bench marks, which are disturbed during construction shall be restored by a Land Surveyor registered to practice in the State of Florida, and all costs thereof shall be borne by the Contractor.
4. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes.

B. HANDLING AND CUTTING PIPE:
1. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating.
2. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

3. In any pipe showing a distinct crack in which it is believed there is no incipient fracture beyond the limits of the visible crack, may be cut off before the pipe is laid so that the pipe used shall be perfectly sound.
4. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.
5. Except as otherwise approved, all cutting shall be done with a power driven cutoff saw.
6. All cut ends shall be examined for possible cracks caused by cutting.

3.02 PIPE INSTALLATION:

A. GENERAL REQUIREMENTS:

1. Water mains shall be constructed of the materials specified and as shown on the drawings.
2. All PVC C900/C905 pipe shall be laid in accordance with AWWA C605. Pipe and fittings shall be carefully handled to avoid damage, and if feasible, while they are suspended over the trench before lowering, they shall be inspected for defects and to detect cracks.
3. Defective, damaged or unsound pipe or fittings shall be rejected. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints.
4. Any pipe, which has its grade or joint, disturbed after laying shall be taken up and relaid.
5. All precautions shall be taken to prevent sand or other foreign material from entering the pipe during installation.
6. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe.
7. Any time the pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the Engineer.
8. Plugs shall remain in pipe ends until all water is removed from the trench.
9. Any sand or foreign material that enters the pipe shall be removed from the pipe immediately.
10. No pipe shall be installed when trench conditions (standing water, excess mud, etc.) or the weather (rain, etc.) is unsuitable for such work, except by permission of the Engineer.
11. Any section of pipe already laid which is found to be defective or damaged shall be replaced with new pipe.

B. PIPE COVER:

1. The cover over all piping shall be a minimum of 30 inches in unpaved areas and 36 inches in paved areas with a maximum of 60 inches unless specifically approved otherwise.
2. Cover for pipe under pavement shall be measured from the finished grade.
3. Any reduction in pipe cover will require approval from the Engineer.
4. Greater depths will be permitted where required to miss obstructions only.
5. Lines shall be located as shown on the drawings.
6. The Contractor shall investigate well in advance of pipe laying any conflicts which may require readjustments in planned locations and advise the Engineer of the results of these investigations so that the Engineer may give instructions as to the modifications required.
7. Refer to Section 02320 for backfill and compaction requirements.

C. INSTALLATION OF IRON PIPING:

1. All iron pipe and fittings shall be laid in accordance with the pipe manufacturer's recommendations and the American Water Works Association Specification AWWA C600.

D. THRUST RESTRAINT:

1. All non-flanged fittings and valves shall be restrained using one of the following methods:
   a. Mechanical restraint at fittings and valves and mechanical restraint along adjacent joints of pipe to a length as specified in the tables on the plans.
   b. Valves shall be restrained using an approved restraining device and/or tie Rods along adjacent joints of pipe to a length as specified in the tables on the plans. All pipe sizes 3 inches - 8 inches in diameter shall have a minimum of 2 tie rods per joint, pipe sizes 10 inches -12 inches in diameter shall have a minimum of 4 tie rods per joint and pipe sizes 14 inches - 20 inches in diameter shall have 6 tie rods per joint. To connect tie rods to fitting, offset eyebolts shall be used. Tie rods shall be 3/4-inch diameter steel, threaded as required, installed with a washer and nut on either side of the joint and shall be coated with a minimum of 5 mils (dry thickness) asphalt or coal-tar prior to backfitting.
   c. The use of thrust blocks shall be limited to situations such as point repair where exposing several joints of pipe is not feasible due to existing ground conditions and also must be used with mechanical joint restraining devices when in the judgment of the Engineer, the nature and criticality of an installation is such as to require positive assurance of stability. Concrete collars with tie rods may be used on dead end lines at the Contractor's discretion. Concrete used for this purpose shall be 2,500 psi minimum. When applicable, schedule and details for the required thrust blocks are included on the drawings. The General Utility Site Work Details show minimum size thrust blocks for use in good soil. Poor soils will require larger thrust blocks.

3.03 MATERIAL TESTING

A. The UD may perform random testing of materials furnished for conformance to the following standards.

B. The entire product of any manufacturer or of any one plant may be rejected when, the methods of manufacture fail to secure uniform results acceptable of the requirements of these specifications.

C. Pipe and materials shall be tested for conformity with, the latest editions of the following:

Item	Specifications
Ductile Iron Pipe and Fittings	ANSI A21.50 (AWWA C150) ANSI A21.51 (AWWA C151) ANSI A21.53 (AWWA C153)
Polyvinyl Chloride Pipe and Fittings	ASTM D1598 ASTM D1599 ASTM D1784 ASTM D1785 ASTM D2122 ASTM D2241 ASTM D2564 ASTM D2672 ASTM D2837 ASTM D2855 ASTM D3139 ASTM F477 AWWA C900 AWWA C905 AWWA C907
Polyethylene Tubing	ASTM D1248 ASTM D2239 ASTM D2737 ASTM D3350 AWWA C901

3.04 WATER MAIN AND NON-WATER MAIN SEPARATION REQUIREMENTS:

A. HORIZONTAL SEPARATION BETWEEN PARALLEL LINES:

1. All new and relocated water mains shall be located at least six feet (preferably ten feet) horizontally from all gravity or pressure type sanitary sewers, wastewater force mains or reclaim water mains. If the bottom of a potable water main is located 6 inches minimum above the top of a gravity type sewer main, the horizontal distance can be reduced to 3 feet minimum.
2. Also, all new and relocated water mains shall be located at least three feet horizontally from all storm sewers, stormwater, force mains, reclaimed water lines carrying reclaimed water for nurseries and vacuum-type sanitary sewers.
3. The horizontal distance between a potable water main and an onsite sewage treatment and disposal system shall be ten feet minimum.
4. All distances are measured from outside pipe edge to outside pipe edge.

B. VERTICAL SEPARATION BETWEEN CROSSING LINES:

1. Any new or relocated water mains that cross any gravity or vacuum-type sanitary sewer, storm sewer, pressure-type sanitary sewer, wastewater main, stormwater, forcemain, or reclaimed water main shall cross above (preferred) or below such pipelines with a minimum vertical distance of 12 inches between the outside of the water mains and the outside of such pipelines.
2. Such crossings shall be arranged so that all pipe joints are equidistant from the point of crossing with no less than ten feet between any two joints (or alternatively, the mains at such crossings shall be placed in sleeves to obtain the equivalent of the ten-foot separation between joints).

3.05 SYSTEM CONNECTIONS:

A. All connections and ties to the Citrus County Water System and transfer of services will be performed by the Contractor under supervision of the Citrus County representative.

B. WATER MAIN CONNECTIONS:
1. Tapped connections in the barrel of a pipe shall be less than the diameter of pipe being tapped except 4-inch pipe which may be tapped with a 4-inch tapping sleeve and valve.
2. No taps shall be made within 5 feet of a joint. When making 2-inch PVC connections to water mains, a flexible connection shall be made using 2-inch polyethylene pipe one foot long (minimum).
3. There shall be a stainless steel nipple between saddle and valve on 2-inch water main service connections.

C. WATER SERVICE CONNECTIONS:
1. Water service connections, which are larger than 1-inch or which are tied to a 12-inch or larger water main, both new and taps to existing, shall have a brass corporation stop at the main at the service saddle.

3.06 FIELD TESTING:

A. DISINFECTION TESTS
1. All water pipe and fittings of whatever size and wherever installed on potable water lines shall be thoroughly disinfected prior to being placed in service.
2. Disinfection shall follow the applicable provisions of the procedure established for the disinfection of water mains as set forth in AWWA Standard C651 entitled "AWWA Standard for Disinfecting Water Mains".
3. Temporary blow-offs, shall be installed for the purpose of clearing the water main.
4. Blow-offs installed on water mains up to and including 12 inches shall be the same diameter as the water main.
5. Blow-offs installed on 16-inch water mains and larger shall be the next smaller size, in diameter, than the water main being tested.
6. Temporary blow-offs shall be removed and plugged after the main is cleared.
7. The Citrus County Representative shall be present prior to and during the operation of blow-offs.
8. The main shall be flushed prior to disinfection.
9. The new water main shall be connected to the existing water main at one point only for flushing purposes (no looping).
10. The new main MUST have a blow off on the end as required in Specification 02352.
11. After the new main is thoroughly flushed, the open end shall be sealed and restrained and the main shall be thoroughly disinfected as specified.
12. The contractor may request, the approval of the Engineer, to use a separate source of water for flushing purposes.
13. Upon completion of the flushing, the contractor shall proceed with disinfecting as specified.
14. Anytime the new line is reopened (to repair defective joints or pipe, defective fitting or valve) the complete disinfecting process shall be repeated.

15. Once bacteriological clearance (on 2 days of samples) has been approved, the main may be pressure tested against an existing system valve.
16. No new water main may be put in service until a Certification of Completion has been approved by the Citrus County Health Department.
17. The contractor must supply, to the Engineer, Citrus County Health Department acceptable record drawings or As-Builts, accurately depicting installed conditions, for the Certification of Completion.
18. The Contractor shall allow time for this process to be completed.

B. LEAKAGE AND PRESSURE TESTS

1. The Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by Citrus County or connecting pipeline to any existing pipeline or facility.
2. All field tests shall be made in the presence of the Engineer. Except as otherwise directed, all pipelines shall be tested. Pipelines laid in excavation (other than trench excavation), shall be tested prior to the backfitting of the excavation.
3. All piping to operate under liquid pressure shall be tested in sections of approved length.
4. For these tests, the Contractor shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment and all labor required.
5. If the Contractor chooses to pressure test against an existing Citrus County water main/valve, the new water main must be disinfected prior to connection to the Citrus County line.
6. Citrus County will not be responsible for failure of the pressure test due to the existing valve leaking.
7. If positive test results cannot be obtained because the Citrus County valves will not hold the test pressures, the Contractor shall be required to disconnect from the Citrus County System and re-test independent of the Citrus County System and at the Contractor's expense.
8. The Contractor will furnish suitable pressure gauges, calibrated by an approved testing laboratory, with increments no greater than 2 psi.
9. Gauges used shall be of such size that pressures tested will not register less than 10% nor more than 90% of the gauge capacity.
10. Leakage and pressure testing shall be in accordance with AWWA C600 and as outlined below.
11. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe.
12. If blow offs or other outlets are not available at high points for releasing air, the Contractor shall make the necessary taps at such points and shall plug said holes, as directed after completion of the test.
13. Hydrostatic testing shall consist of a combined pressure test and leakage test.
14. Specified test pressures, based on the elevation of the highest point of the line or section under test, and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer.
15. The pump, pipe connection and all necessary apparatus, shall be furnished by the Contractor and shall be subject to the approval of the Engineer.
16. All valved sections shall be hydrostatic tested to insure sealing (leak allowance) of all line valves (see Specification 02351).

17. All piping shall be pressure and leakage tested for a minimum of two hours duration at 150 psi.
18. Pressure tests shall be conducted with a pressure loss of not more than 5 psi regardless of length being tested.
19. No pipe will be accepted if pressure loss is greater than 5 psi. regardless of leakage test results.
20. All exposed pipe, fittings, valves and joints shall be examined carefully during the test.
21. Any damaged or defective pipe, fittings or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory.
22. Repairing, replacing and retesting shall be done at the Contractor's expense.
23. Leakage tests shall be conducted simultaneously with the pressure tests.
24. At the end of the pressure test, the line will be pumped back to initial test pressure.
25. The quantity of water used to repump the line shall be measured and compared to the limitations calculated using the leakage equations and chart shown below.
26. No pipe installation will be accepted if the leakage is greater than determined by the formulas or chart as shown below. If any test discloses leakage greater than that specified below, the Contractor shall, at its own expense, locate and repair the defective material and retest until the leakage is within the specified allowance.

For DIP Pipe	For PVC Pipe
L = (SDP1/2)/13320	L=(NDP1/2)/7400
Where	
L = Leakage, GPH (allowable leakage)	L =Leakage, GPH
S =Length of pipe run, FT	N = No. of Joints
D = Dia., Inches	D = Dia. Inches
P = Test Pressure, PSI	P = Pressure, PSI

High Density Polyethylene Pipe (HDPE)

Allowable Limits for Leakage:
Table I Test Phase Make-up Amount

Make-Up Water Allowance (U.S. Gals per 100 ft of Pipe)				Make-Up Water Allowance (U.S. Gals per 100 ft of Pipe)			
Nom. Size (In)	1 Hour Test	2 Hour Test	3 Hour Test	Nom. Size (In)	1 Hour Test	2 Hour Test	3 Hour Test
1 1/4	0.06	0.1	0.16	16	1.7	3.3	5
1 1/2	0.07	0.1	0.17	18	2	4.3	6.5
2	0.07	0.11	0.19	20	2.8	5.5	8
3	0.1	0.15	0.25	22	3.5	7	10.5
4	0.13	0.25	0.4	24	4.5	8.9	13.3
5	0.19	0.38	0.58	26	5	10	15
5 3/8	0.21	0.41	0.62	28	5.5	11.1	16.8
6	0.3	0.6	0.9	30	6.3	12.7	19.2
7 1/8	0.4	0.7	1	32	7	14.3	21.5
8	0.5	1	1.5	34	8	16.2	24.3
10	0.8	1.3	2.1	36	9	18	27
12	1.1	2.3	3.4	42	12	23.1	35.3
13 3/8	1.2	2.5	3.7	48	15	27	43
14	1.4	2.8	4.2	54	18.5	31.4	51.7

27. In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting or joint.
28. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be re-tested as necessary until test requirements are complied with.
29. All testing shall be performed at the Contractor's expense.
30. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made with approval; but, in any event, the Contractor shall be responsible for the ultimate tightness of the piping within the above requirement.
31. Re-disinfecting shall be required if the line is de-pressurized for repairs prior to tying into the Citrus County system.
32. Installed locate wiring shall be tested by the contractor using an approved testing company using approved equipment. Locate wire testing company must be provided a copy of the As-Builts.

3.07 INSPECTION:

A. All pipe and fittings shall be subject to inspection at time of delivery and also in the field just prior to installation.

B. All pipe and fittings which, in the opinion of the Engineer, do not conform to these specifications will be rejected and shall be removed by the Contractor at the Contractor's expense.

C. An authorized Citrus County representative must be present for all pressure and leakage testing, connections to Citrus County's existing lines and the collection of water samples.

D. The Citrus County representative will take water samples and deliver them to the lab.

3.08 STATE HIGHWAY CROSSINGS:

A. Permits for all work within the right-of-way of a State Highway will be obtained by the Engineer.

B. The Contractor shall, however, verify the existence of the permit before commencing work in this area.

C. All work related to the State Highway crossing shall be in full compliance with the requirements of the Florida Department of Transportation permit and in accordance with the Florida Department of Transportation Utility Accommodation Guide and standard specifications.

D. Unless otherwise shown on the drawings or specified herein, State Highway crossings shall be made by jacking a steel pipe casing, of the size shown on the drawings and shown in Citrus County General Utility Site Work Details, under the highway at the elevations and locations shown.

E. The water main shall then be placed in the casing with approved casing spacers as specified in the CCDWR MSCSWE.

F. All joints within carrier pipe shall be mechanically restrained joints.

G. After inspection, the ends of the casing shall be closed with an approved end seal, or otherwise provide an end closure meeting FDOT requirements.

3.09 LOCATE WIRING:

A. Contractor shall furnish and install locate wiring on all PVC water mains and polyethylene and PVC water services installed.

B. Locate wire on services shall be limited to a continuous loop of wire extending 3 feet along the service from the main. .

C. Locate wire must be attached to water mains and services with plastic zipper type ties at each side of bell joint or fitting and at1 foot intervals along pipeline.

D. Locate wire shall be brought to within 8 inches of grade outside a valve box or water meter box, as required, at 475 foot intervals.

E. Locate wire shall be installed along pipeline as detailed.

F. Locate wire shall be installed on top of the pipe.

G. Locate wire shall be attached to intersecting PVC pipelines using a three way splice and brass split ground clamp with wire installed around brass nipple.

H. Locate wiring must have the ability to conduct an electrical current, therefore, the wiring must be continuous with any breaks in the line spliced with approved wire connectors.

I. Installed locate wiring shall be tested by the contractor using an approved testing company using approved equipment. Locate wire testing company must be provided a copy of the As-Builts.

3.10 NEW WATER SERVICES:

A. New water services shall be furnished and installed in the sizes and locations indicated on the plans.

B. Short services shall be services installed on the same side of the road as the water main.

C. Long services shall be services installed on the opposite side of the road as the water main.

D. Services shall be installed by open cut or boring as indicated on the drawings or as directed by the Engineer.

E. Boring may be accomplished by any method approved by the Engineer except that no water jetting shall be allowed.

END SECTION

SECTION 02351
WATER VALVES AND APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The Contractor shall furnish, install, joint, and test all gate valves, butterfly valves, check valves and other special valves and appurtenances as shown on the drawings and herein specified.

B. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated.

C. Only those materials included in the Approved Materials and Equipment List shall be installed unless otherwise directed.

D. All materials shall be new unless specifically called for otherwise.

1.02 SECTION INCLUDES:

A. Furnishing and installing valves, cocks, hydrants and miscellaneous piping appurtenances.

1.03 REFERENCED SECTIONS:

A. Section 03300 - Cast-In-Place Concrete

B. Section 02315 - Excavation

C. Section 02350 - Water Mains and Appurtenances

1.04 REFERENCES:

A. American National Standards Institute (ANSI)

B. AWWA C500, C502, C504, C508, C509, C800

C. ASTM A48, A126, A276, A296, A429, A536

D. A.S.S.E. Standard 1020

E. Federal Specifications (FS)

F. CCDWR MSCSWE: Citrus County Department of Water Resources, Utilities Division "Minimum Standards & Construction Specifications For Water & Wastewater Systems", Latest Edition, including all amendments.

G. FDOT SSRBC: "Standard Specifications for Road and Bridge Construction", State of Florida, Department of Transportation, - Latest Edition, including all amendments.

1.05 SHOP DRAWING SUBMITTALS:

A. Actual catalog data, brochures and descriptive literature will not be required for items of standard usage which meet the requirements of Specification 02351 and are listed in the Approved Materials and Equipment List.

B. Any specially item not shown in this list will require a complete shop drawing submittal.

C. The Engineer may at any time require the Contractor to provide a complete detailed shop drawing submittal for any material which may, in the Engineer's opinion, not be in compliance with the Citrus County Utility Specifications.
1. Verify compliance with the specification.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Packing and Shipping:
1. Prepare valves and accessories for shipment according to AWWA C500, Section 6 and seal valve ends to prevent entry of foreign matter into valve body.

1.07 ROTATION OF OPENING:

A. All valves larger than two inches installed within a water system to be Citrus County owned shall open by turning to the left or counter-clockwise, when viewed from the stem.

1.08 EXTENSION STEMS:

A. Where extension stems are required, substantial, adjustable wall brackets and extension stems shall be furnished and located as directed.

B. Extension stems shall be provided on all buried valves when the operating nut is deeper than 30 inches below the final grade.

C. Sufficient stem extension shall be provided so that the nut will be no more than 30 inches below finished grade.

1.09 PAINTING OF VALVES AND VALVE BOX LIDS:

A. The top side of all water valve box covers shall be painted blue except for gate valves at fire hydrants.

B. Top of valve box covers at fire hydrants shall be painted yellow.

C. Oil based, traffic-rated paint shall be used.

1.10 LOCATING MARKERS FOR VALVES:

A. A 'V' cut where indicated in the plans shall be carved in the curb closest/adjacent to a below grade valve.

B. This 'V' cut shall be painted blue.

1.11 MATERIAL WARRANTY

A. The manufacturer of materials furnished on a project shall supply to Citrus County, a one (1) year unconditional warranty.

B. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications.

1.12 CONTRACTOR WARRANTY

A. The Contractor shall supply to Citrus County a one (1) year unconditional warranty.

B. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Hydrants
1. Mueller, Super Centurion 250, Decator, IL
2. Dresser Industries, Inc., M&H Style 929, Bradford, PA
3. Approved equal.

B. Hydrant Paint
1. Sherwin-Williams, Cleveland, Oh
2. Tnemec Company, Inc., Kansas City, MO
3. Minnesota Mining and Manufacturing Co. (3M), Sl. Paul, MN
4. Approved Equal

C. Gate Valves
1. Clow Valve Co., Oskaloosa, IA
2. Mueller Co., Decator, IL
3. American Valve and Hydrant, Birmingham, AL
4. Waterous Co., Sl. Paul, MN
5. Approved Equal

D. Tapping Sleeve
1. Clow Valve Co., Oskaloosa, IA
2. Mueller Co., Decator, IL

3. American Valve and Hydrant, Birmingham, AL
4. Approved Equal

2.02 GATE VALVES:

A. GENERAL

1. Gate valves 3 to 12 inches in diameter shall be designed for 200 psi minimum working pressure.
2. Valves over 12 inches in diameter shall be designed for 150 psi minimum working pressure.
3. When full open, gate valves shall have a clear waterway equal to the nominal diameter of the pipe.
4. The operating nut or wheel shall have an arrow cast in the metal indicating the direction of opening.
5. Each valve shall have the manufacturer's distinctive marking, pressure rating and year of manufacture cast on the body.
6. Prior to shipment from the factory, each valve shall be tested by applying to it a hydrostatic pressure equal to twice the specified working pressure.
7. Gate Valves smaller than 3" shall be Milwaukee Valve No. 1176 (non-rising stem) or 1153 (rising stem) or approved equal, 200 lb. SWP, 400 lb. WOG, heavy duty service solid wedge disc, stainless seat gland packed, union bonnet and threaded ends.

2.03 BURIED VALVES:

A. Buried gate valves shall be iron body bronze mounted, rubber encapsulated, resilient seat, solid wedge, non-rising stem type with operating nuts and adjustable valve boxes and covers.

B. Operating nuts shall be two inches square.

C. Resilient seat or wedge type gate valves shall conform to applicable sections of AWWA Standards C500 double disc or C509 resilient seat.

D. All gate valves 20 inches or larger must be bevel geared for both horizontal and vertical installations.

E. All valves shall be installed vertically unless additional depth of bury is impossible due to physical obstructions.

2.04 ABOVE GROUND VALVES:

A. Gate valves located above ground or inside structures shall be hand wheel operated, non-rising stem type with flanged ends and be of the same general construction as buried valves.

2.05 VALVE JOINTS:

A. All gate valves shall have mechanical joint ends, flanged ends, or screw joints to fit the pipe run in which they are used, except valves installed on push-on joint pipe shall have mechanical joint ends unless otherwise specified.

2.06 BUTTERFLY VALVES:

A. GENERAL
1. Butterfly valves may be used on water mains larger than 24 inches. Butterfly valves shall not be used on pipe 24 inches or smaller.
2. All butterfly valves shall be of the tight closing, rubber seat type with rubber seats which are recess-mounted and securely fastened to the valve body or attached to the valve disc.
3. Valves shall be bubble tight at rated pressures in both directions of flow and shall be satisfactory for applications involving valve operation after long periods of inactivity.
4. Valve discs shall rotate 90 degrees from the full open position to the tight shut position.
5. Valves shall meet the full structural requirements of the applicable classes of AWWA C504.

B. VALVE BODIES:
1. Valve bodies shall be constructed of ductile iron conforming to ASTM A126, Class B, and buried valves shall have integrally cast mechanical joint ends.
2. Above ground valves shall be flanged in accordance with ANSI B16.1, Class 125.
3. Two trunions for shaft bearings shall be integral with each valve body.
4. Body thickness shall be in accordance with AWWA C504.

C. VALVE DISCS:
1. Valve discs shall be constructed of Ni-Resist, Type 1 or ductile iron, ASTM A536, Grade 65-45-12 with stainless steel seating edges.
2. All disc-seating edges not incorporating recess-mounted rubber seats shall be smooth and polished.

D. VALVE SHAFTS:
1. Valve shafts shall be "Stub Shaft" type or one piece, extending full size through the disc (or a minimum of 1-1/2 shaft diameters per "stub shaft" valves) bearings and into the operating mechanism and shall be constructed of ASTM A276, type 304 stainless steel or a stainless steel with greater overall corrosion and oxidation resistance, or shall be high tensile steel with stainless steel shaft journals, teflon bushings and shaft seals.
2. Shaft diameters shall meet the minimum requirements of AWWA C508 for Class 150B.

E. VALVE SEATS:
1. Shall be of a natural rubber or a synthetic rubber compound.
2. Bonded seats shall be simultaneously molded in, vulcanized and bonded into the valve body.

3. Seat bond must withstand 75 lb. Pull under test procedure ASTM 0429, Method B.
4. Valve seats on 24" diameter valves and larger shall be field adjustable and replaceable without dismantling operator, disc or shaft and without removing the valve from the line.
5. Provision for adjustment shall take the form of heavy corrosion resistant retaining segments which lock the seat rigidly in position after adjustment and which will effect a minimum of 1/8 inch change in seat rise at equal increments around the periphery.
6. Seats attached to the valve disc shall be held in place by a stainless steel, ASTM A296, Grade CF8, retaining ring.
7. Cap screws through the rubber seat and the seat retaining ring must be provided for adjustment of the rubber seat.
8. The mating body seat shall be constructed of type 304 stainless steel.

F. VALVE BEARINGS:
1. Valves shall be fitted with sleeve type bearings.
2. Bearings shall be corrosion resistant and self-lubricating,
3. Bearing load shall not exceed the published design load for the bearing material, or 1/5 of the compressive strength of the bearing or shaft material.

G. VALVE OPERATORS:
1. Manual valve operators shall be of the worm gear or traveling nut type and fully enclosed.
2. Units furnished for buried service shall be fully gasketed and grease packed.
3. Valves located above ground shall be equipped with hand wheel operators and shall have a suitable indicator arrow to give valve position from full open to fully closed.
4. Buried valves, designated to be furnished with above ground operators, shall be equipped with hand wheel operators and position indicators on extended bonnet.
5. The hand wheel for buried valves shall be set 3 feet above finished grade.
6. All other buried butterfry valves shall be furnished with 2 inch AWWA nut operator with valve box and cover.
7. Operator components shall, at the extreme operator positions, withstand, without damage, a pull of 200 lb for hand wheel or chain wheel operators or an input torque of 300 ft. lb. for operating nuts.

2.07 CHECK VALVES:

A. Check valves shall conform to the requirements of AWWA C508.

B. Check valves larger than 2-inch nominal size shall be iron body, flanged ends, outside lever, spring loaded, swing type with straight-away passageway of full pipe area.

C. The valve shall have renewable bronze seat ring and rubber-faced disc.

D. Check valves larger than 2 inches shall be 150 psi working pressure.

E. Check valves 2 inches and smaller nominal size shall be all brass swing check valves, 200 psi working pressure.

F. Buried check valves shall be installed in an approved access box with traffic rated cover.

2.08 MISCELLANEOUS VALVES AND APPURTENANCES:

A. TAPPING VALVES
1. GENERAL: Tapping valves shall be iron body, bronze mounted gate valves, non-rising stem, open left, resilient seat, 2 inch square operating nut, for vertical mounting in approximately level setting on buried water lines.
2. The valve ends shall be mechanical joint for use with ductile iron pipe on one side and standard flanged (Class 125) on the other.
3. Valves shall conform to the checklist for Citrus County Approved Materials of the CCDWR MSCSWE.

B. DISINFECTION OF TAPPING OR DRILLING MACHINE:
1. Prior to tapping a potable water main, the drilling machine's pilot drill, shell cutter and cutter hub shall be sterilized in accordance.
2. Four gallons of potable water shall be combined with 8 oz. of sodium hypochlorite (household bleach); the pilot drill, shell cutter and cutter hub shall be swabbed until clean or totally immersed in the sterilizing solution and allowed to remain wet at least five minutes before tapping operation commences.
3. It is not necessary to rinse the sterilizing solution from tapping components prior to use.

C. HYDROSTATIC AND LEAKAGE TEST:
1. After installing a tapping sleeve and valve, and prior to service tapping of a pressurized water main, a hydrostatic and leakage test shall be performed.
2. The test will be conducted by introducing water into a tap or test hole located at the neck of the outlet half of the sleeve, on sleeves furnished with said tap, and with the tapping valve in the closed position.
3. Sleeves shall be provided with a test plug.
4. The sleeve and valve shall be capable of maintaining a test pressure of 150 psi for 30 minutes duration, with no sign of visible leaks.
5. All leaks shall be repaired by removing and replacing defective items with items free of defects, after which the sleeve and valve shall be re-tested.
6. Such repair and re-testing shall be done until the installation passes the specified test.
7. The Contractor shall furnish and install any necessary temporary restraints, gauges, pumps and other incidental and appurtenant items necessary to complete this work, and shall remove same upon completion of the test.
8. A watertight plug shall then be inserted into the test hole.

D. CORPORATION STOPS:
1. Corporation stops shall be manufactured from cast bronze with machined fitting surfaces, and in accordance with AWWA C800 in sizes 3/4 inch through 2 inches.

2. The inlet connection shall be AWWA Standard Corporation stop thread or iron pipe (IPT) thread.
3. The outlet connection shall be a flare nut fitting for Type K copper tubing or a pack joint outlet for copper or plastic tubing.
4. Corporation stops shall be required on all services larger than 1 inch and all services which connect to a 12-inch or larger water main.
5. Corporation stops shall be installed at the service saddle at the intersection of the water main and the service pipe.

E. CURB STOP:
1. Curb stops shall be manufactured from cast bronze with machined fitting surfaces and in accordance with AWWA C800 in sizes 3/4 inch through 2 inches.
2. Curb stop shall be full-port ball valve with check, combined cap and tee, with lock wing cast on stop body and operating tee cap to provide for locking the stop in closed position.
3. Curb stops for use with copper services shall have an inlet connection with a flare nut fitting for Type K copper tubing, and an outlet connection with female iron pipe thread or shall have an inlet connection with a compression joint and an outlet connection with female iron pipe thread.
4. Curb stops for use with Schedule 40 PVC pipe shall have outlet connections with female iron pipe threads and inlet connections with female iron pipe threads.
5. These stops will require the use of an approved Schedule 40 PVC adapter (MIPT X SLIP).
6. When performing pressure tests, curb stops must be capped or plugged and tested in the open position.

F. BALL VALVES:
1. Ball valves shall be limited to 3/4 inch through 2 inches in size and shall have cast bronze body, bronze tee head, stem with check, full roundway opening and provisions for locking in a closed position.
2. Ball valves for use with copper services shall have an inlet connection with a flare nut fitting for Type K copper tubing and an outlet connection with female iron pipe thread, or shall have an inlet connection with a compression joint (insert stiffener will be used with plastic service connections) and an outlet connection with female iron pipe thread.
3. Ball valves for use with Schedule 40 PVC pipe shall have an outlet connection with female iron pipe threads and an inlet connection with either a compression joint or female iron pipe threads.
4. The latter will require the use of an approved Schedule 40 PVC Adapter (MIPT X SLIP).
5. Compression joints will require insert stiffeners.
6. Below grade ball valves on water mains must have 2 inch operating nuts and be installed in standard valve boxes.

G. SERVICE OR TAPPING SADDLE:
1. Service saddles shall have stainless steel double straps with malleable iron or ductile iron body and have iron pipe threads (IPT).
2. Outlet sizes shall be 3/4 inch through 2 inches.

3. The outside diameter range of the saddle shall be properly sized to conform to the type of pipe being tapped.

2.09 FIRE HYDRANTS:

A. GENERAL

1. Fire hydrants shall be 5 1/4-inch, ductile iron body, fully bronze mounted, for 150 psi working pressure, complying with AWWA Standard C502.
2. The inlet connection shall be mechanical joint type, with accessories, for 6-inch ductile iron pipe.
3. The hydrant foot shall be epoxy coated and have integral cast tie-back lugs.
4. The integral shut-off valve shall be compression type opening against water pressure, counterclockwise (left) hand openings.
5. Valve diameter and general interior design shall be sufficient to provide head loss/flow quantity ratios less than specified in the above-cited Standard.
6. The main valve seat and the threaded portion of the hydrant into which it screws shall be bronze.
7. The hydrant barrel drain valve and port shall be bronze.
8. The hydrant barrel drain shall be actuated by operation of the main valve stem.
9. The stem operating threads and thrust bearing shall be sealed, by "O" rings, from exposure to moisture and shall be provided with means for lubrication.
10. The hose nozzles shall be bronze with National Standard fire hose coupling screw threads, one 4 1/2 inch pumper nozzle and two 2 1/4 inch hose nozzles.
11. The hydrant operating nut and nozzle cap nuts shall be 1 ¼ inch tapered square.
12. Pipe used for fire hydrant laterals shall be ductile iron Pressure Class 200.
13. Tees and bends leading to fire hydrants shall be ductile iron only.
14. The nozzle caps shall be securely chained to the hydrant barrel.
15. The chains shall be free from rust or corrosion and painted to match the color of the hydrant.
16. The hydrants shall be "Traffic" type with a frangible flange or lugs and operating stem section at the ground line.
17. The hydrant shall be painted with the above ground finish color "Federal Safety Yellow".

B. INSTALLATION:

1. Fire hydrants shall be installed at the locations shown on the drawings in accordance with the Standard Details.

C. INDEPENDENT VALVE:

1. Independent valve furnished with each hydrant shall be 6 inch, non-rising stem gate valve with mechanical joint ends in conformance with the sub-section entitled "Gate Valves" of these specifications.
2. Independent valves shall be provided with a cast iron valve box in conformance with the sub-section entitled "Valve Boxes".

D. HYDROSTATIC AND LEAKAGE TEST:

1. Hydrostatic, mechanical, hydraulic, and leakage tests shall be conducted in accordance with AWWA C502, Section 5.

2.10 VALVE BOXES

A. GENERAL:
1. The Contractor shall furnish, assemble and install a valve box for each buried valve.
2. Each valve box installed in non-paved areas shall be installed with a 24 inch square, 6 inch thick concrete collar poured to grade around the top of the valve box cover.
3. The concrete .shall have a minimum strength of 2500 psi.
4. Provide brass identification tag with "Water", valve size and valve types epoxyed or riveted to interior of valve box.
5. Tag shall be 2 inch diameter, 1/8 inch thick brass, located a maximum of 2 inches below the top of the valve box.

B. VALVE BOXES:
1. Adjustable 3-piece valve boxes of suitable length shall be used.
2. Cover shall be marked "Water".
3. The top section shall be adjustable for elevation and shall be set to allow equal movement above and below finished grade.
4. The base shall be centered over the valve and shall be on line with nut at top of valve stem and the entire assembly shall be plumb.
5. Boxes for paved areas shall be cast iron.
6. Cast iron castings shall be manufactured of clean, even grain, gray cast iron conforming to ASTM Designation A48, Class 20B, Gray Iron Castings; and shall be smooth, true to pattern, free from blow holes, sand holes, projections, or other harmful defects and shall be coaled with a single thin coat of coal tar epoxy.
7. The cover will not rock after it has been seated in any position in its associated jacket.

C. DEBRIS CAP:
1. Debris caps shall be required in all valve boxes.
2. The debris cap shall be comprised of a hollow member having a cylindrical outer surface, a closure for one end and three point resilient contact pads projecting from the outer surface.
3. One contact pad shall be movable by means of a cam having a low angle of advance whereby external forces applied to the cam via the movable contact pad will not cause rotation of said cam.
4. The cap shall have a flexible skirt providing an outward seal preventing debris from getting past the cap.
5. The cap must withstand without slippage, a minimum vertical force of 50 lbs. at a loading rate of 1.0 inches/minute.
6. The cap shall have retaining prongs to retain a standard locating coil, and shall be capable of installing a standard fitting for "Lock-out/Tag-out" in compliance to all standards and requirements of State and Federal OSHA guidelines.

2.11 METER BOXES

A. CONCRETE:
1. Where called for on the drawings, concrete meter boxes shall be the type as listed in Citrus County's Water and Sewer Standards, and shall be installed in accordance with the Water and Sewer Standard Details.
2. Meter boxed shall accommodate the "touch read" system.
3. Use of concrete meter boxes requires pre-approval by the UD.

B. COPOLYMER:
1. Where called for on the drawings, copolymer meter boxes shall be the type as listed in Citrus County's Water and Sewer Standards and shall be installed in accordance with the Water and Sewer Standard Details.
2. Meter boxes shall accommodate the "touch read" system

2.12 BACKFLOW PREVENTION DEVICES

A. DOUBLE CHECK VALVE BACKFLOW ASSEMBLY:
1. Where called for on the drawings, double check valve backflow assembly shall be the type as shown in Citrus County's Water and Sewer Standards, and shall be installed in accordance with the Citrus County's Water and Sewer Standard Details.

B. DOUBLE CHECK VALVE DETECTOR ASSEMBLY:
1. Where called for on the drawings, double check valve detector assembly shall be the type as listed in Approved Materials and Equipment and shall be installed in accordance with Citrus County's Water and Sewer Standard Details.

C. REDUCED PRESSURE PRINCIPLE ASSEMBLY:
1. The reduced pressure backflow preventor shall consist of two independently operating check valves and a hydraulically dependent differential relief valve and two independent ball valve shut-offs.
2. The reduced pressure backflow preventor shall protect against back-siphonage and back-pressure conditions with both checks fouled.

D. ATMOSPHERIC (NON-PRESSURE) TYPE VACUUM BREAKER:
1. Where called for on the drawings, atmospheric (non-pressure) type vacuum breakers shall be the type as listed in Approved Materials and Equipment and shall be installed in accordance with Citrus County's Water and Sewer Standard Details.

E. PRESSURE TYPE VACUUM BREAKER:
1. The pressure vacuum breaker shall be a device containing within its structure an approved check valve, vacuum relief, inlet and shutoff valves and field testing cocks.
2. All moving parts shall be corrosion resistant.
3. The device shall meet the requirements of A.S.S.E. Standard 1020.

2.13 WATER METERS

A. COMPOUND WATER METER:
1. Where called for on the drawings, compound water meters shall be the type as listed in Approved Materials and Equipment and shall be installed in accordance with Citrus County's Water and Sewer Standard Details.

B. TURBINE WATER METER:
1. Where called for on the drawings, turbine water meters shall be the type as listed in Approved Materials and Equipment and shall be installed in accordance with Citrus County's Water and Sewer Standard Details.

C. COMPACT FIRELINE WATER METERS:
1. Where called for on the drawings, compact fireline water meters shall be the type as listed in Approved Materials and Equipment and shall be installed in accordance with Citrus County's Water and Sewer Standard Details.

D. POSITIVE DISPLACEMENT WATER METER:
1. When called for on the drawings or specified, the positive displacement water meter shall be the type listed in the Approved Materials and Equipment List and shall be installed in accordance with Citrus County's Water and Sewer Standard Details.

PART 3 – EXECUTION

3.01 EXAMINATION:

A. Verification of Conditions:
1. Inspection:
a. Fire Hydrants:
1) Thoroughly inspect
2) Thoroughly clean interior
3) Open and close hydrant as many times as required to insure that parts are in proper working order, the valves seating properly, and the drain valve operating freely.
4) Check the packing gland to determine if the packing is in place and the gland nut is properly tightened.

3.02 INSTALLATION:

A. General:
1. Install valves and accessories in accordance with the manufacturer's recommendation
2. Set valve and valve boxes plumb
3. Install valve box directly over the valve it serves with the top of the box flush with finish grade
4. Fill around box with earth and thoroughly tamp on all sides

B. Fire Hydrants:
   1. Set for required minimum pipe cover over supply line and to keep nozzles 12" minimum above grade
   2. Anchor in place or block adequately to prevent the hydrant from blowing off the supply connection
   3. Provide 1/2 cubic yards of crushed stone around the hydrant and below the top of the supply pipe. Fill to 6 inches above the hydrant drain.
   4. Install plumb.
   5. Install hydrants with pumper nozzles so that hose nozzles are parallel with, and the pumper nozzle perpendicular to, the curb line.

3.03 ADJUSTING:

A. Check and adjust valves and accessories for smooth operation in accordance with manufacturer's instructions.

END SECTION

SECTION 02355
PACKAGED POTABLE WATER PUMPING SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. This specification gives a general description of a prefabricated, skid-mounted, turn-key, variable speed, packaged pumping system built by a single manufacturer. All equipment shall be mounted on a single base. The packaged pumping system shall provide the system demand for water within the pressure and flow range listed in these specifications. The manufacturer of the system shall provide a single source responsibility for the manufacture and service of the system. This specification covers the minimum requirements; however, it does not cover all details, which may vary in accordance with the requirements of the offered equipment.

1.02 REFERENCES

A. ANSI/NSF – 61, 250

B. ANSI/IEEE – 6241

C. ANSI - 125/150

D. AWWA – C504

E. WC - 1094

F. UL – 508A, 508, 514B, 651, 1449, 1660

G. CCDWR MSCSWE: Citrus County Department of Water Resources, Utilities Division "Minimum Standards & Construction Specifications For Water & Wastewater Systems", Latest Edition, including all amendments.

H. FDOT SSRBC: "Standard Specifications for Road and Bridge Construction", State of Florida, Department of Transportation, - Latest Edition, including all amendments.

I. UD: Citrus County, Department of Water Resources, Utilities Division.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 01340 and include copies of all materials required to establish compliance with these specifications. At a minimum, they shall include the following:
   1. Shop drawings showing important details of construction and dimensions.
   2. Descriptive literature, bulletins, and/or catalogs of the equipment.
   3. A detailed description of the system operation, including pressure and flow ranges, pump sequencing, and controller functionality.

4. Performance curves and data sheets on the pumps showing head, capacity, efficiency, NPSHR, and design and maximum horsepower.
5. Total weight of the equipment.
6. Bill of Materials for the system.
7. Electrical information, including control schematic, panel layout, VFD/motor specifications.

1.04 SUPPLIERS

A. The packaged pumping system shall be Grundfos, Goulds, or an engineer approved equal.

1.05 WARRANTY

A. The packaged pumping system shall be covered against defects in material and workmanship for a period of twelve (12) months from start-up.

1.06 PRODUCT SUPPORT

A. The packaged pumping system manufacturer shall provide factory-direct service personnel for the set, start-up, preventative maintenance and general service of the system. A factory direct, service technician must be located within 100 miles of the project site. The packaged pumping system manufacturer must have service technicians on-call twenty-four hours per day, seven days a week.

PART 2 - PRODUCTS

2.01 MECHANICAL

A. SYSTEM BASE

1. A structurally sound fabricated base with provisions for secure and proper mounting and support of all equipment. Main support members shall be of a standard structural shapes such as channel, wide flange or I-beam. Provisions shall be made in the system base for off-loading and handling at the installation site. The base shall be fabricated of 316 stainless steel or Series 6061-T6 aluminum. For an aluminum base a neoprene gasket shall be provided to the contractor for installation between the base and the concrete pad. The material shall be provided in a roll with self-adhesive on one side for ease of installation.

B. MAIN PUMP(S)

1. All pumps shall be ANSI/NSF 61 approved for drinking water.
2. The pumps shall be of the in-line vertical multi-stage design.
3. The head-capacity curve shall have a steady rise in head from maximum to minimum flow within the preferred operating region. The shut-off head shall be a minimum of 20% higher than the head at the best efficiency point.

4. The pump impellers shall be secured directly to the pump shaft by means of a splined shaft arrangement.
5. The suction/discharge base shall have ANSI Class 250 flange or internal pipe thread (NPT) connections as determined by the pump station manufacturer.
6. Pump construction shall be as follows:
   a. Suction/discharge base, pump head, motor stool: Cast iron (Class 30)
   b. Impellers, diffuser chambers, outer sleeve: 304 Stainless Steel
   c. Shaft 431 Stainless Steel
   d. Impeller wear rings: 304 Stainless Steel
   e. Shaft journals and chamber bearings: Silicon Carbide
   f. O-rings: EPDM
   g. shaft Couplings cast iron/ductile iron
7. The shaft seal shall be a balanced o-ring cartridge type with the following features:
   a. Collar, Drivers, Spring: 316 Stainless Steel
   b. Shaft Sleeve, Gland Plate: 316 Stainless Steel
   c. Stationary Ring: Silicon Carbide w/graphite
   d. Rotating Ring: Silicon Carbide w/graphite
   e. O-rings: EPDM
8. Shaft seal replacement shall be possible without removal of any pump components other than the coupling guard, shaft coupling and motor. The entire cartridge shaft seal shall be removable as a one piece component.

C. PUMP MOTORS
1. Each motor shall be of the Integrated Variable Frequency Drive design consisting of a motor and a Variable Frequency Drive (VFD) built and tested as one unit by the same manufacturer.
2. The VFD shall be of the PWM (Pulse Width Modulation) design using current IGBT (Insulated Gate Bipolar Transistor) technology.
3. The VFD shall convert incoming fixed frequency three-phase AC power into a variable frequency and voltage for controlling the speed of motor. The motor current shall closely approximate a sine wave. Motor voltage shall be varied with frequency to maintain desired motor magnetization current suitable for centrifugal pump control and to eliminate the need for motor de-rating.
4. The VFD shall utilize an energy optimization algorithm to minimize energy consumption. The output voltage shall be adjusted in response to the load, independent of speed.
5. The VFD shall automatically reduce the switching frequency and/or the output voltage and frequency to the motor during periods of sustained ambient temperatures that are higher than the normal operating range. The switching frequency shall be reduced before motor speed is reduced.
6. An integral RFI filter shall be standard in the VFD.
7. The VFD shall have a minimum of two skip frequency bands which can be field adjustable. The VFD shall have internal solid-state overload protection designed to trip within the range of 125-150% of rated current.
8. The integrated VFD motor shall include protection against input transients, phase imbalance, loss of AC line phase, over-voltage, under-voltage, VFD over-temperature, and motor over-temperature. Three-phase integrated VFD

motors shall be capable of providing full output voltage and frequency with a voltage imbalance of up to 10%.

9. The integrated VFD motor shall have, as a minimum, the following input/output capabilities:
   a. Speed Reference Signal: 0-10 VDC, 4-20mA
   b. Digital remote on/off
   c. Fault Signal Relay (NC or NO)
   d. Fieldbus communication port (RS485)
10. The motor shall be Totally Enclosed Fan Cooled (TEFC) with a standard NEMA C-Face, Class F insulation with a temperature rise no higher than Class B.
11. The cooling design of the motor and VFD shall be such that a Class B motor temperature rise is not exceeded at full rated load and speed at a minimum switching frequency of 9.0 kHz.
12. Motor drive end bearings shall be adequately sized so that the minimum L10 bearing life is 17,500 hours at the minimum allowable continuous flow rate for the pump at full rated speed.

D. SPARE PARTS

1. Provide one replacement mechanical seal for each pump.

E. BOLTS

1. All bolts, nuts, and miscellaneous hardware shall be 316 stainless steel for corrosion resistance. Bolts shall be grade 5, minimum.

F. PIPING

1. All piping shall be Schedule 5 steel, sized per drawings. The pipe shall be given a hydrostatic test to 150% of the maximum pump shut-off pressure. If the pumps are not fitted with suction and discharge gage taps, the provision for such shall be made in the piping system.
2. Internal surfaces of steel piping shall be coated with an NSF-approved epoxy coating.
3. Pump suction and discharge manifolds shall be constructed of 3 inch 316 stainless steel.

G. CHECK VALVES

1. Check valves shall be of the silent operating design that incorporates a center guided spring loaded poppet, guided at opposite ends and having a short linear stroke that generates a flow area equal to the pipe. The body shall be a full flange design in cast iron construction with bronze seat and disc and a stainless steel spring. The valve leakage rate shall not exceed one-half the allowable rate by the American Water Works Association. The valves shall be wafer style and shall be manufactured by Valmatic or equal.

H. PUMP AND STATION ISOLATION VALVES

1. Each butterfly valve shall be AWWA C504 rated and have a one-piece cast or ductile iron body, a cast iron disc with 316SS edge, an EPDM seat, and a 316 SS shaft. Valves shall be of the flanged design. Valve shall include a standard,

10 position, locking handle and shall be manufactured by Henry Pratt, Dezurik, or equal.

I. SYSTEM PRESSURE TANK

1. System shall include one (1) – 66 gallon ANSI/NSF 61 approved hydro-pneumatic tank. Tank shall be of the diaphragm bladder type. Tank shall have a neoprene bladder. Tank diameter shall be 24 inches. Tank inlet pipe size shall be 1 ¼" in diameter. Tank shall have one (1) 1 ¼" isolation ball valve. Tank height shall be 47 ¾". Tank shall have an ASME rated working pressure of 150 psi. Tank shall be precharged to 70% the system pressure set point prior to placing the unit in operation. Tank shall be painted steel, factory shop primed and finished coated with Tnemec Series 141 Pota-Pox 80 epoxy or approved equal. Finish color shall be blue. Tank shall Therm-x-trol ST 120V-C as manufactured by Amtrol, Inc. or approved equal.

J. PRESSURE GAGES

1. Gages shall have a liquid-filled 316 SS stainless steel case with a 316 SS welded bourdon tube and socket. The gage shall have a 1% full-scale ASME Grade 1A accuracy over the entire range and have a 4" face diameter. The gage shall be provided with a stainless steel isolation valve. Gages shall be manufactured by Ashcroft, Daughtridge, or approved equal.

K. FLEXIBLE CONNECTORS

1. Flexible connectors shall be of the flanged, single arch type, designed for pressure and vacuum service. The tube shall be a single, chlorobutyl piece extending from flange to flange. The internal reinforcement shall be of the nylon, tire cord type. The flanges shall be drilled to standard ANSI 125/150 lbf dimensions. The connector shall be rated for a minimum temperature of 250oF. Pressure rating shall be from full vacuum to 200 psig. Control rods shall be used. Flexible connectors shall be manufactured by Unaflex or equal.

L. PAINT

1. All external structural steel surfaces, pumps, motors, and other appurtenances shall be primed with an industrial grade epoxy primer and finish coated with Tnemec Series 141 Pota-Pox 80 epoxy or approved equal. Finish color shall be blue.

2.02 ELECTRICAL

A. CONTROLS

1. The control cabinet with controls must be UL 508A listed as a complete assembly by the system supplier. All wiring shall be in accordance with the latest N.E.C. codes.
2. There shall be permanently affixed to the interior side of the exterior enclosure door a data plate, a laminated wiring diagram, and a bill of materials. The nameplate information shall include: horsepower, voltage, phase, full-load amps and short circuit current rating. The wiring diagram shall include: the control panel manufacturer's name, address and telephone number along with

the date of manufacture. The wiring diagram must be updated to reflect the actual construction and shall be labeled 'As-Built'.

3. Terminal points of all wires and terminal strips shall be permanently identified. All terminal numbers and identifying nomenclature shall correspond to and be shown on electrical diagrams. All circuit breakers, control switches, indicator pilot lights and other control devices shall be identified with permanently affixed legend plates and lamicoid-type engraved nameplates where applicable.

B. ENCLOSURE

1. The control and power equipment shall be mounted in a NEMA 3R/12, 304 SS floor-standing enclosure with leg kit and three-point latch. The enclosure shall include a removable back panel. All indicating lights, reset buttons, H-O-A switches, etc., shall be rated NEMA 4X and shall be mounted on the panel door or on a panel deadfront.

C. LIGHTNING AND SURGE PROTECTION

1. An internally-mounted transient voltage surge suppressor shall be provided on the incoming power source to protect all electrical devices. The unit shall be designed in accordance with ANSI/IEEE 62.41 and shall be UL 1449 listed. Transient voltage surge suppressor shall be manufactured by Ditek, APT, Meter Treater or equal.

D. CIRCUIT BREAKERS

1. Thermal-magnetic, molded-case circuit breakers shall be used to supply short circuit protection for each motor and shall be rated for a minimum 18,000 amp interrupting current. Fuses shall not be acceptable for motor power circuit protection. Circuit breakers shall be manufactured by Square D or equal.

E. CONTROL POWER

1. The control power shall be single phase, 120 V and/or 24 V, and shall be protected by circuit breakers and/or fuses of a rating to conform to U.L. 508A standards. If a control transformer is required, it shall be manufactured by Square D or equal.

F. GFI RECEPTACLE

1. A 15 amp, duplex, GFI receptacle shall be provided, powered through a dedicated circuit breaker.

G. PHASE MONITOR

1. A plug-in type phase monitor shall be provided to sense phase loss sequence. Automatic reset of the phase protection circuit shall occur after the fault condition has been corrected. Individual phase monitors on each motor are not required; single point monitoring of incoming phase is acceptable. Phase monitor shall be manufactured by Diversified or equal.

H. PRESSURE SWITCH

1. Pressure switches shall be the diaphragm type and suitable for water use. Each switch shall have an adjustable set point and differential, appropriate for the application. The switch shall be NEMA 4X rated, single pole and double

throw. Pressure switches shall be manufactured by Square D, Dwyer, Murphy or equal.

I. PRESSURE TRANSDUCER:

1. A solid-state, analog, pressure transmitter shall be provided to measure the changing pressure in the system. The transducer shall be industrial quality with 316 SS wetted metal parts and a NEMA 4X enclosure. The transducer shall have a 4-20 mA output through shielded cable, and shall incorporate reverse polarity protection. Sensor shall employ a NPT sized connection. The overall accuracy of the transducer shall be ± 0.25% of the full scale output. Pressure transducers shall be as manufactured by Wika, Rosemount or equal.

J. INSERTION PADDLEWHEEL FLOW SENSOR & FLOW INDICATOR

1. A solid-state, analog, hot tap insertion paddlewheel flow sensor and flow indicator shall be provided to measure and indicate the booster system flow. The flow sensor shall be industrial quality with 316 SS wetted metal parts. The sensor shall have a 4-20 mA output through shielded cable, and shall incorporate reverse polarity protection. Sensor shall employ a valved 2" NPT sized connection. A 3" pipe saddle shall be used to mount sensor in discharge header. The overall accuracy of the sensor shall be ± 1.5% of the full scale output. Flow indicator shall be powered by an external DC source. Flow indicator shall have a n4-20ma output signal. Unit is a two wire loop powered device. Unit shall be mounted adjacent to paddlewheel flow sensor. Flow sensor shall be SeaMetrics IP115 hot tap unit with 2" ball valve. Flow indicator shall be SeaMetrics Model FT420 wall mounted unit with external DC power supply.

K. PROGRAMMABLE LOGIC CONTROLLER

1. The pump system controller shall be a standard product developed and supported by the booster pump station manufacturer.
2. The controller shall be microprocessor based capable of having software changes and updates via personal computer (notebook). The controller user interface shall have a VGA display with a minimum screen size of 3-1/2" x 4-5/8" for easy viewing of system status parameters and field programming. The controller user interface display shall be backlit with contrast adjustment. Password protection of system settings shall be standard.
3. The controller shall provide internal galvanic isolation to all digital and analog inputs as well as all fieldbus connections.
4. The controller shall display the following as status readings from a single display on the controller. The listed display settings below shall be the default settings:
   a. Current value of the control parameter, (discharge pressure and flow)
   b. Most recent existing alarm
   c. System status with current operating mode
   d. Status of each pump with current operating mode and rotational speed as a percentage (%)
5. The controller shall have as a minimum the following hardware inputs and outputs:

a. Three analog inputs (4-20mA or 0-10VDC)
b. Three digital inputs
c. Two digital outputs
e. Ethernet connection
f. Field Service connection to PC for advanced programming and data logging

6. Pump System Programming including Field Adjustable Pump System Programming, shall include as a minimum the following:
   a. Analog or digital water shortage protection.
   b. Transducer Settings (Suction and Discharge Analog supply/range)
   c. PI Controller (Proportional gain and Integral time) settings
   d. High system pressure indication and shut-down
   e. Low system pressure indication and shut-down
   f. Low suction pressure/level shutdown (via digital contact)
   g. Low suction pressure/level warning (via analog signal)
   h. Low suction pressure/level shutdown (via analog signal)
   i. Flow meter settings (analog signal)
7. With additional input/output modules, the system controller shall be able to accept up to seven closed loop programmable set-points and seven open loop programmable set-points.
8. The controller shall have advanced water shortage protection. When the inlet analog pressure sensors are used for water shortage protection, there shall be two indication levels. The first pressure measurement is a warning indication that the inlet water pressure is lower than normal. A second pressure measurement is for complete system shut-down for low inlet water pressure. System restart after shut-down shall be manual by the attending operator.
9. The system pressure set-point shall be capable of being automatically adjusted by using an additional external set-point. The additional set-point function enables the operator to adjust the system control parameter (typically pressure) by measuring an additional parameter (system flow).
10. The controller shall be capable of receiving a remote analog set-point (4-20mA or 0-10 VDC) as well as a remote system on/off (digital) signal.
11. The pump system controller shall store up to 24 warning and alarms in memory. The time, date and duration of each alarm shall be recorded. A additional relay shall be provided for alarm notification to the site SCADA system. The controller shall display the following alarm conditions:

High System Pressure	Low system pressure
Low suction pressure (warning and/or alarm)	Individual pump failure
VFD trip/failure	Loss of sensor signal (4-20 mA)
Loss of remote set-point signal (4-20mA)	System power loss

12. The pump system controller shall be mounted in a fan cooled NEMA 3R enclosure. The entire control panel shall be UL 508 listed as an assembly. The control panel shall include a main disconnect, circuit breakers for each pump and the control circuit and control relays for alarm functions.
    Control panel options shall include, but not be limited to:

Pump Stop & Run Lights	Pump Alarm Lights
System Fault Light	Audible Alarm (80 db[A])

Surge Arrestor — Control Panel Internal Illumination
Emergency/Normal Operation Switches
Service Disconnect Switches
Emergency Generator Power Receptacle for connection of 3-phase power
20 amp breaker protected 120v GFI receptacle
Interior panel light with 120v switch

13. The controller shall be capable of receiving redundant discharge pressure sensor input to function as a backup to the primary sensor.
14. The controller shall have a pump "Test Run" feature such that pumps are switched on during periods of inactivity where the system is switched to the "off" position but with electricity supply still connected. The controller shall have a user selectable switch to automatically operative the pumps for a period of two to three (2-3) seconds every 24 hours, 48 hours or once per week.
15. The controller shall be capable of providing instantaneous power consumption (Watts or kilowatts) and cumulative energy consumption (kilowatt-hours) when connected to integrated VFD motors through the field bus.
16. The actual pump performance curves on suitable software shall be loaded into the pump system controller.

L. LOW FLOW STOP FUNCTION

1. The system controller shall be capable of stopping pumps during periods of low-flow or zero-flow without wasting water or adding unwanted heat to the liquid. Temperature based no flow shut-down methods that have the potential to waste water and add unwanted temperature rise to the pumping fluid are not acceptable.
2. The system controller shall be capable of detecting low flow when only one pump is in operation (less than 10% of pump nominal flow) without the use of additional flow sensing devices.
3. The system controller shall increase pump speed until the discharge pressure reaches the stop pressure, a system set-point plus 50% of programmed on/off band, when a low flow is detected,. The pump shall remain off until the discharge pressure reaches the start pressure, a system set-point minus 50% of programmed on/off band.
4. System restart for low demand/normal demand shut-down:
   a. Low Flow Restart – A slow drop in system pressure, indicating little system demand, the lead pump starts and pump speed is increased until the system stop pressure step point is attained, followed by system shut down.
   b. Normal Flow Restart – A fast drop in system pressure, indicating system demand is greater than 10% of pump nominal flow, the lead pump starts and pump speed is increased until the system pressure reaches the system set-point followed by system shut down.

M. STANDARD PANEL FEATURES

1. A three-position HAND/OFF/AUTO switch shall be provided for each pump. In the HAND position, the pump shall operate using a preset point of each pump motor VFD. In the OFF position, pump operation is not allowed. In the AUTO position, operation of the pumps shall be controlled by the PLC.

2. Individual run lights shall be provided for each pump. The indicating lights shall not be wired through the PLC and shall not count towards the discrete I/O total.

N. STANDARD CONTROLLER PROGRAM FEATURES

1. The system controller shall operate equal capacity variable speed pumps to maintain a constant discharge pressure (system set-point). The system controller shall receive an analog signal [4-20mA] from a factory installed pressure transducer on the discharge manifold which indicates the actual system pressure. As flow demand increases the pump speed shall be increased to maintain the system set-point pressure. When the operating pump(s) reach 96% of full speed (adjustable), an additional pump will be started and will increase speed until the system set-point is achieved. When the system pressure is equal to the system set-point all pumps in operation shall reach equal operating speeds. As flow demand decreases the pump speed shall be reduced while system set-point pressure is maintained. When all pumps in operation are running at low speed the system controller shall switch off pumps when fewer pumps are able to maintain system demand.
2. The system controller shall be capable of switching pumps on and off to satisfy system demand without the use of flow switches, motor current monitors or temperature measuring devices.
3. All pumps in the system shall alternate automatically based on demand, time and fault. If flow demand is continuous and no flow shut-down does not occur, the system controller shall have the capability to alternate the pumps every 24 hours, every 48 hours or once per week. The interval and actual time of the pump change-over shall be field adjustable.

O. STANDARD OPERATOR-INTERFACE-DEVICE (OID) CONTROLS

1. The OID shall use a combination of function keys and/or touch-screen controls to change screens and to modify system setpoints. At a minimum the following separate screens shall be provided:
   a. System Monitoring: Displays current pressures and the run status of each pump. This screen shall be immediately accessible from all other screens via a "system status" button.
   b. Pump Status and Monitoring: Display includes parameters including run status, run time, and alternator status (lead/lag).
   c. Pressure and Flow Configuration: Displays the low suction pressure alarm setpoint, low discharge pressure alarm setpoint, and pump start and stop pressure setpoints. User configurable pressure setpoints may be changed from this screen.
   d. Daily Alternation Times: Displays the time at which the pumps are forced to alternate. Daily alternation can be turned on and off from this screen.
   e. Backup Mode: Displays the current mode of operation. These modes of operation shall include: normal, pressure transmitter fail, and shutdown. All setpoints related to the backup operation of the station shall be displayed and configured from this screen.
   f. Help and Information Screen: Displays pertinent information about the system including information about the pumps, PLC, OID, and the

software used to program the system. Contact information shall also be displayed on this page.

g. Alarm Annunciator: Displays a list of active alarms. Alarms may be acknowledged on this screen.

h. Timers: Displays the current timer setpoints. These shall include power fail lock out delay, phase fail lockout delay, and pump on/off timers. All timers shall be adjustable from this screen.

i. Alarm History: Displays an alarm history. This history shall include a log of all active and past alarms.

P. WIRING

1. All external wiring shall be enclosed in conduit. All power wire shall be stranded and sized as required for load and application according to the National Electric Code. All power wiring on the load side of the VFD shall be rated for 2000 volts. All control and signal wire shall be a minimum of #14 AWG, 90oC insulated and color-coded. All wiring on the rear of the inner door shall be neatly bundled using tie wraps or other means. All internal wiring on the backplate shall be neatly routed in wire duct with removable covers. All wiring shall be continuous point-to-point (no splices) and be totally accessible. All power wires terminals shall be torqued to manufacturer's specifications.

Q. CONDUIT

1. All external wiring shall be enclosed in rigid and flexible conduit. PVC conduit shall be rigid Schedule 80, sunlight resistant and shall be UL listed (UL 651) and shall comply with Federal Specification WC-1094 and NEMATC-2. Liquid tight flexible nonmetallic conduit shall be UL listed (UL 1660) and shall be Carlon Carflex liquid tight flexible nonmetallic conduit or equivalent. Liquid tight nonmetallic connectors shall be UL listed (UL 514B) and shall be Carlon Carflex liquid tight nonmetallic fittings or equivalent. Each section of flexible nonmetallic conduit shall not exceed 6 feet in length.
2. All conduit shall be mounted on 316SS or aluminum Unistrut stands located not more than 24" apart on the baseplate. Conduit shall not be mounted directly to the baseplate. Attachment of the conduit to the Unistrut shall be by two-piece pipe straps or by Uni-Clip supports only. Attachment by perforated metal or by wires is not acceptable. The Unistrut stands shall be secured to the baseplate with 1/4" stainless steel fasteners.
3. For the purposes of routing and spacing conduit, conductor cables shall be divided into the following two categories:
   a. Category 1 conductors shall include AC power lines, and digital DC I/O signals to hard contact switches, relays, and solenoids.
   b. Category 2 conductors shall include analog I/O lines, DC power lines for analog circuits, digital AC lines, digital DC I/O lines with specific sensitivity requirements and communication cables.
4. Category 2 conductors shall have the following minimum spacing from conduit containing category 1 conductors based on the power in the category 1 conduit per the following table:

Power	Minimum Spacing
Less than 20 amps	6"
More than 20 amps and less than a total of 100kVA	12"
100kVA or more	24"

5. The electrical equipment on the skid shall be located in such a fashion as to prevent the signal conduit and power conduit from crossing. If a crossover of power conduit and signal conduit is unavoidable, then the crossover must occur at a right angle.

2.03 SYSTEM ENCLOSURE

A. The entire system shall be installed in a weatherproof, ventilated enclosure as specified in section 02356.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Installation shall be in strict accordance with the manufacturer's requirements.

3.02 FACTORY TESTING

A. Non-witness factory hydrostatic and mechanical function testing of the package shall be performed prior to shipment. Customer approval of the testing prior to shipment is not required.

3.03 FIELD TESTING

A. A minimum of two (2) eight-hour days of start-up service shall be provided. One day of service shall be provided at initial commission with the second day being provided approximately one month after initial start-up. The second day shall be used to fine-tune the system operation and to provide follow-up training. Field tests will not be conducted until such time as the entire installation is complete and ready for operation. This includes the completion of all piping, electrical connections and inspections, and availability of supply water. During start-up the system supplier shall run the pumps through normal start and stop, and full load conditions. The pump supplier shall make any adjustments and correct any defects at no cost to the owner. Tests shall be performed until satisfactory results are obtained. A training session shall be performed at the time of start-up.

B. Upon successful startup, the pump manufacturer's representative shall provide a letter stating that the system has been installed properly, is operating correctly and is eligible for warrnaty coverage.

3.04 OPERATION AND MAINTENANCE MANUALS

A. Two (2) complete sets of operation and maintenance manuals shall be provided. At a minimum, the manuals shall include:

1. Shop drawings showing important details of construction and dimensions.
2. Descriptive literature, bulletins, and/or catalogs of the equipment.
3. A detailed description of the system operation, including pressure and flow ranges, pump staging, and controller functionality.
4. Guaranteed performance curves and data sheets on the pumps showing head, capacity, efficiency, NPSHR, and design and maximum horsepower.
5. Total weight of the equipment.
6. Complete Bill of Materials for the system.
7. Electrical information, including control schematic and panel layout.
8. Manufacturer's Operation and Maintenance Manuals with parts cross-sections.
9. Recommended spare parts.
10. Contact phone numbers for troubleshooting and service.

B. Manuals shall be provided in both hardcopy and PDF format.

3.05 PUMP PERFORMANCE

A. Pumps shall be furnished in accordance with the following pump performance schedule below:

TABLE "A"
POTABLE BOOSTER PUMP STATION DESIGN CONDITIONS

Number of Pumps	3
Design Capacity Per Pump (GPM)	50
Total Dynamic Head (FT.)	32
Run-out Capacity (GPM)(All Pumps)	175
Run-out TDH (FT.)(with all pumps running)	65
Horse Power Per Pump (H.P)	1.5
Shut-off Head (Ft.) (per pump)	95
Discharge Size (Inches)	2.0"
Pump Model Number	Grundfos CRE 10-2
Impeller	Stainless Steel
Number of Impellers	2
Impeller Diameter (Inches)	1.4301 DIN W.-Nr.
Shaft Seal	HQQE
Pump Housing	Cast Iron
Maximum Motor Speed (R.P.M)	3500
Electric Service – Voltage & Phase	480 V/ 3Ø

END OF SECTION

SECTION 02356
POTABLE WATER BOOSTER SYSTEM ENCLOSURE

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to design, fabricate, deliver to project site and erect a pre-engineered metal enclosure for the water booster system as specified herein.

B. Material furnished shall include base channels, and anchor bolts, framing, roofing and siding, plates, and wall caps air inlet louvers, framed openings for access doors, trim fasteners, sealants, and all other component parts for a complete weather tight, exterior envelope. Roof and walls of building shall be insulated.

C. All materials shall be new, fabricated in a workmanlike manner, and free of defects.

1.02 RELATED WORK NOT INCLUDED

A. Concrete foundations are specified in Division 3.

1.03 SUBMITTALS

A. Submit to the Engineer as provided in Section 01340 complete plans showing dimensions set to coordinate with concrete dimensions shown.

B. Submit product information, specifications and installation instructions for all components and accessories proposed.

C. Submit shop drawings and complete erection drawings for review as provided in Section 01340, including:
   1. Anchor bolt and base channel settings.
   2. Transverse cross-sections and details of openings, covering and trim.

D. Records
   1. Furnish the Engineer the following records:
      a. Letter signed and sealed by a professional engineer registered in the state where the building is to be erected certifying that the self-framing panels proposed meet the design criteria set forth by the Engineer.
      b. Two sets of design calculations sealed by a professional Engineer registered in state where the building is to be erected for the project records.
      c. One set of reproducible "as built" erection plans.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver and store prefabricated structural components, sheets, panels, and other manufactured items so they will not be damaged or deformed.

B. Stack materials on platforms or pallets as required. Cover with tarpaulins or other suitable weathertight ventilated covering. Store metal sheets or panels so that water accumulation will drain freely. Do not store sheets or panels in contact with other materials, which might cause staining.

C. Materials or finishes of the enclosure shall not be damaged during handling or storage.

1.05 QUALITY ASSURANCE

A. Manufacturer's qualifications
1. Contractor shall provide enclosure as produced by manufacturer with at least five years successful experience in fabrication of Aluminum enclosures of type and quality required.

1.06 DESIGN CERTIFICATION REQUIREMENT

A. Certification
1. Contractor shall submit written certification prepared and signed by a Professional Engineer registered in the State of Florida to verify that enclosure meets indicated loading requirements and codes of authorities that have jurisdiction.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer
1. Contractor shall be subject to compliance with specified requirements, provide the enclosure by Hot Box, Jacksonville, FL or engineer approved equal.

2.02 DESCRIPTION OF STRUCTURE

A. Enclosure shall be 175 inches long by 45 inches wide by 86 ½ inches high.

B. Panels shall be constructed from 18 gauge, mil-finished aluminum, with over lapping "tongue and groove" joints.

C. Self framing wall and roof panel construction as primary structural system providing clear inside height and width shown.

D. Overall dimensions of the building shall be as shown on the contract drawings.

E. Unit shall have Two 18" x 18" screened inlet air louvers and two 1000 cfm, 120v, thermostatically controlled exhaust fans with auxiliary control switches.

F. Units shall have one (1) 120/240-volt electrical panel, surface mounted electrical conduits, wire, breakers, receptacles, switches to Florida codes.

G. Unit shall have four 60 watt 120volt ceiling mounted incandescent switched lights.

H. Unit shall be Model HB10Es as manufactured by Hot Box, Jacksonville, FL.

2.03 DESIGN CRITERIA

A. Members and coverings shall be designed for all applicable loads and combinations of thee loads as set forth in the MBMA, "Recommended Design Practices Manual" and as required by governing building code. Wind load for project design is in accordance with Florida State Building Code. Roof panels shall have a U.L. wind uplift Class 90 rating.

B. Design, fabrication, and erection of the building shall conform to the applicable sections of the latest edition or revision of the following codes and standards:
   1. American Society of Testing and Materials Material designation as specified herein by ASTM number.

2.04 MATERIALS

A. Structural
   1. Members shall be fabricated from 6061- T6 Aluminum flat plate and tubular shapes.
   2. Aluminum shall be 18 gauge minimum.
   3. Fasteners shall be 316 stainless steel.
   4. Sealing Tape shall be 100% solids, pressure sensitive grey polyisobutylene compound tape with release paper backing. Not less than 2in. wide and 1/8in. thick, nonsag, nontoxic, non-staining and permanently elastic.
   5. Joint Sealant shall be one-part elastomeric; polyurethane, polysulfide, or silicone rubber as recommended by metal building manufacturer and as approved.
   6. Insulation shall be spray-applied polyisocyanurate foam to 1 ½" in thickness.

2.05 ENCLOSURE INSULATION

A. General
   1. Contractor shall provide manufacturer's recommended thermal insulation system, subject to owner's approval.
   2. Contractor shall provide all electrical to current Florida codes.
   3. Insulation shall comply with all current Florida codes.

PART 3 - EXECUTION

3.01 MATERIALS RECEIVED

A. Contractor shall Receive, unload and inspect all enclosure building components for short and damaged materials. Defective and short materials will be replaced or made good at no expense to the Owner.

3.02 INSPECTION

A. Examine the concrete conditions under which work is to be performed and set anchor bolts true to line and grade. Notify the Engineer in writing of unsatisfactory conditions.

B. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.03 ERECTION

Contractor shall assemble enclosure on concrete slab for Water Booster System and perform the following work:

A. Anchor bolts shall be drilled into concrete slab. Base channels shall be installed in place, leveled and grouted under this Section.

B. Framing shall be erected for the structure true to line, level and plumb, rigid and secure.

C. Framed Openings shall be provided from Aluminum shapes of proper design and size.

D. Fasteners – Roofs and Walls
   1. Install screw fasteners with power tool having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or panels. Install fasteners in predrilled holes.

3.04 PROTECTION AND COMPONENT REPLACEMENT

Contractor shall protect work of this Section from damage by other trades. Contractor shall correct any damage to painted surfaces by cleaning, repairing or replacing, and refinishing, as directed by the Engineer.

END OF SECTION

SECTION 02357
PACKAGED DIESEL-DRIVEN, CENTRIFUGAL FIRE PUMP SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. This specification gives a general description of a prefabricated, skid-mounted, packaged pumping system built by a single manufacturer. All equipment shall be mounted on a single base. The packaged pumping system shall provide the system demand for water within the pressure and flow range listed in these specifications. The manufacturer of the system shall provide a single source responsibility for the manufacture and service of the system. This specification covers the minimum requirements; however, it does not cover all details, which may vary in accordance with the requirements of the offered equipment.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements Specification Sections, apply to this Section.

1.02 REFERENCES

A. ASTM – A53, A53M, B88, B88M

B. ASME – B16.5, B16.9, B16.21, B16.21, C1107

C. ANSI – A156.3, A8132

D. UL – 50, 218, 393, 448, 508, 668, 1236, 1247, 1478, 1728

E. CCDWR MSCSWE: Citrus County Department of Water Resources, Utilities Division "Minimum Standards & Construction Specifications For Water & Wastewater Systems", Latest Edition, including all amendments.

F. FDOT SSRBC: "Standard Specifications for Road and Bridge Construction", State of Florida, Department of Transportation, - Latest Edition, including all amendments.

G. UD: Citrus County, Department of Water Resources, Utilities Division.

1.03 SUMMARY

A. This Section includes packaged diesel-drive, split-case centrifugal fire pump and the following:
   1. Fire-pump controllers.
   2. Fire-pump accessories and specialties.

3. Pressure-maintenance pumps, controllers, accessories, and specialties.
4. Pump house.

1.04 PERFORMANCE REQUIREMENTS

A. Pump, Equipment, Accessory, Specialty, and Piping Pressure Rating: 175-psig (1,200-kPa) minimum working-pressure rating, unless otherwise indicated.

B. The packaged fire pump system shall be designed in accordance with FPA 20. The system shall be approved by an independent third party testing service. The system shall be mounted on a structural steel base and include all necessary components as to allow the Contractor only to install suction piping to, and discharge piping from, the skid and connect incoming power and fire alarm to the skid.

C. Overall Pump House Building Size: Approximately 12 feet wide by 11 feet long by 9 feet high. Fire pump building shall be supplied complete with all necessary component parts, to form a complete building system and all parts shall be new and free from all defects or imperfections.

D. The Pump House building width and length shall be measured from the outside of the building trim, and the height of the building shall be the distance measured from the bottom surface of the base to the top of the building trim.

E. The Pump House building supplier shall supply a complete set of building erection drawings showing a step-by-step construction sequence for the erection of the building. The erection drawings shall be prepared specifically for the building covered by these Specifications showing the location of all roof and wall accessories and the exact anchor bolt locations required for each accessory.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, certified pump performance curves with each selection point indicated, operating characteristics, and furnished accessories and specialties for each fire pump and pressure-maintenance pump.

B. Shop Drawings: For packaged fire pump and driver, fire-pump controller, fire-pump accessories and specialties, pressure-maintenance pump, pressure-maintenance-pump controller, pressure-maintenance-pump accessories and specialties, and pump house. Include plans, elevations, sections, details, and attachments to other work.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2. Wiring Diagrams: Power, signal, and control wiring.

C. Product Certificates: For each type of fire pump and fire-pump controller, signed by product manufacturer.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For fire pump and driver, pressure-maintenance pump, controller, accessories and specialties, to include in emergency, operation, and maintenance manuals.

1.06 QUALITY ASSURANCE

A. Source Limitations: Obtain packaged diesel driven fire pump package from one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with standards of authorities having jurisdiction pertaining to materials, hose threads, and installation.

D. Comply with NFPA 20, "Stationary Pumps for Fire Protection," for fire pumps, drivers, controllers, accessories, and their installation.

1.07 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3, Concrete.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 CENTRIFUGAL FIRE PUMPS

A. Description, General: UL 448, factory-assembled and -tested, diesel-drive, centrifugal fire pumps capable of furnishing not less than 150 percent of rated

capacity at not less than 65 percent of total rated head and with shutoff head limited to 140 percent of total rated head.

1. Finish: Manufacturer's standard red paint applied to factory-assembled and tested unit before shipping.
2. Nameplate: Complete with capacities, characteristics, and other pertinent data.

B. Fabricate base and attachment to fire pump, pressure-maintenance pump, and controller with reinforcement to resist movement of pump and controller during a seismic event when their bases are anchored to building structure.

C. Single-Stage, Horizontally Mounted, Split-Case Fire Pump: Double-suction type with pump and driver mounted on same base and connected with coupling.

1. Manufacturers:
   a. Patterson Pump Company.
   b. Peerless Pump Company, Grundfos USA.
   c. Aurora Pump; Pentair Pump Group.
   d. Fairbanks Morse; Pentair Pump Group.
   e. A-C Pump; ITT Industries.
2. Pump: Axially split cast-iron casing with suction and discharge flanges machined to ASME B16.1, Class 125 dimensions, unless otherwise indicated.
   a. Impeller: Cast bronze of construction to match fire pump, statically and dynamically balanced, and keyed to shaft.
   b. Wear Rings: Replaceable, bronze.
   c. Shaft and Sleeve: Steel shaft with bronze sleeve.
      1) Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
      2) Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.
3. Coupling: Flexible and capable of absorbing torsional vibration and shaft misalignment. Include metal coupling guard.
4. Driver: UL 1247, horizontal-shaft, diesel engine.
   a. Manufacturers:
      i. Caterpillar; Engine Div.
      ii. Cummins, Inc.
      iii. Detroit Diesel Corporation.
      iv. Clarke USA, Inc.
   b. Emergency Manual Operator: Factory wired for standby engine starting and operation in case of main controller or wiring malfunction.
   c. Engine Cooling System: Factory-installed heat exchanger.
      i. Coolant: Type recommended by driver manufacturer.

d. Engine Cooling System: Factory-installed water piping, valves, strainer, pressure regulator, heat exchanger, coolant pump, bypass piping, and fittings.
   1) Piping: ASTM B88, Type L (ASTM B88M, Type B), copper water tube; ASME B16.22, wrought-copper, solder-joint pressure fittings; AWS A5.8, BCUP Series brazing filler metal; and brazed joints.
e. Engine-Jacket Water Heater: Factory-installed electric elements.
f. Dual Batteries: Lead-acid-storage type, with 100 percent standby reserve capacity.
g. Fuel System: According to NFPA 20.
   1) Fuel Storage Tank: Size indicated, but not less than required by NFPA 20. The system shall be supplied with a double wall above ground UL approved fuel tank. The capacity shall be equal to one gallon per engine horsepower, plus 5 percent volume for expansion and 5 percent volume for sump, as a minimum. Tank shall be equipped with an indicating fuel gauge, 4" screened tank vent, fill cap, and suitable supply and return fuel piping to pump engine.
h. Exhaust System: ASTM A53/A53M, Type E or S, Schedule 40, black steel pipe; ASME B16.9, weld-type pipe fittings; ASME B16.5, steel flanges; and ASME B16.21, nonmetallic gaskets. Fabricate double-wall, ventilated thimble from steel pipe.
   i. Exhaust Connector: Flexible type.
   ii. Exhaust Silencer: Industrial type.

D. Fire-Pump Characteristics and Specialty Data:
1. Fire-Pump Plan No.: FP-1.
   a. Rated Capacity: 1,000 GPM.
   b. Total Rated Head: 40 PSI.
   c. Inlet Size: 8 inch.
   d. Outlet Size: 6 inch.
   e. Speed: Same as driver.
2. Diesel-Engine Driver: 41 approximate horsepower.
   a. Speed: 1,800 approximate rpm.
3. Test Header Size: 6 inch.
   a. Hose Valves Required: Four.
   b. Hose Valve Size: NPS 2-1/2 (DN 65).
4. Relief Valve Size: 4 inch.
5. Cone Size: 4 by 8 inch.

2.03 FIRE-PUMP CONTROLLERS

A. Description: UL 218 and NFPA 20 listed for diesel-drive, fire-pump service; combined automatic and manual operation; factory assembled and wired; and factory tested for capacities and electrical characteristics.

1. Manufacturers:
   a. Cutler-Hammer.
   b. Firetrol, Inc.
   c. Joslyn Clark.
   d. Master Control Systems, Inc.
   e. Metron, Inc.
2. Enclosure: UL 50, Type 2, drip-proof, indoor, unless special-purpose enclosure is indicated. Include manufacturer's standard red paint applied to factory-assembled and -tested unit before shipping.
   a. Mounting: Floor or wall type for field electrical connections.
3. Controls, devices, alarms, functions, and operations listed in NFPA 20 as required for drivers and controller types used, and specific items listed.
4. Battery Charge UL 1236, built-in, dual-battery type.
5. Time clock for weekly automatic test.
6. System pressure recorder, electric ac driven with spring backup.
7. Engine run time meter.
8. Power failure start, with time delay to prevent start at momentary loss of power
9. System digital event recorder.
10. Low-fuel-level alarm.
11. Alarm contacts for remote alarm of "Engine Run," "Switch Off," and "Engine Fail to Start."
12. Pump room alarms, including both audible and visible signals.
13. Nameplate: Complete with capacity, characteristics, approvals and listings, and other pertinent data.
14. Controller Sensing Pipes: Fabricate pipe and fittings according to NFPA 20 with nonferrous-metal sensing piping, NPS 1/2 (DN 15), with globe valves for testing controller mechanism from system to pump controller as indicated. Include bronze check valve with 3/32-inch (2.4-mm) orifice in clapper or ground-face union with non-corrosive diaphragm having 3/32-inch (2.4-mm) orifice.

2.04 FIRE-PUMP ACCESSORIES AND SPECIALTIES

A. Match fire-pump suction and discharge ratings as required for fire-pump capacity rating. Include the following:
   1. Automatic air-release valve.
   2. Suction and discharge pressure gages.
   3. Eccentric-tapered reducer at suction inlet.
   4. Concentric-tapered reducer at discharge outlet.
   5. Test-Header Manifold: Ferrous body for hose valves. Manufacturer's standard finish. Include bronze or cast-iron, exposed-type valve header with nozzle outlets; and round, brass escutcheon plate with lettering equivalent to "PUMP TEST CONNECTION."
   6. Hose Valves: UL 668, straightway pattern, and bronze with cap and chain. Include NFPA 1963 hose thread that complies with local fire

department standards and finish same as for test-header-manifold escutcheon plate.

7. Ball Drip Valve: UL 1726.
8. Main Relief Valve: UL 1478, spring loaded.
9. Discharge Cone: Closed type.
10. Fire Department Connection: Ferrous body for threaded inlet connections, to match local. Manufacturer's standard finish. Include bronze or cast-iron, exposed-type valve header with threaded nozzle inlets; and round, brass escutcheon plate with lettering equivalent to "FIRE DEPARTMENT CONNECTION." Locate in accordance with Citrus County requirements.
11. Finish: Manufacturer's standard factory-applied red paint unless brass or other finish is specified.

2.05 PRESSURE-MAINTENANCE PUMPS

A. Pressure-Maintenance Pumps, General: Factory-assembled and -tested pumps with electric-motor driver, controller, and accessories and specialties. Include cast-iron or stainless-steel casing and bronze or stainless-steel impellers, mechanical seals, and suction and discharge flanges machined to ASME B16.1, Class 125 dimensions unless Class 250 flanges are indicated and except that connections may be threaded in sizes where flanges are not available.

1. Finish: Manufacturer's standard color paint applied to factory-assembled and tested unit before shipping.
2. Nameplate: Complete with capacity, characteristics, and other pertinent data.

B. Multistage, Pressure-Maintenance Pumps: Multiple-impeller type complying with HI 1.1-1.2 and HI 1.3 requirements for multistage centrifugal pumps. Include base.

1. Manufacturers:
   a. A-C Pump; ITT Industries.
   b. Grundfos Pumps Corp.
   c. Peerless Pump Company.
   d. Taco, Inc.
2. Driver: NEMA MG 1, TEFC induction motor complying with NFPA 20 and NFPA 70. Include wiring compatible with controller used.

C. Controllers: UL 508; factory-assembled, -wired, and -tested, across-the-line type for combined automatic and manual operation.

1. Manufacturers:
   a. Cutler-Hammer.
   b. Firetrol, Inc.
   c. Peerless Pump Company
   d. Joslyn Clark.

e. Master Control Systems, Inc.
f. Metron, Inc.

2. Enclosure: UL 508 and NEMA 250, Type 1 or 2, wall-mounting type for field electrical wiring.
   a. Finish: Manufacturer's standard color paint applied to factory-assembled and tested unit before shipping.
3. Rate controller for scheduled horsepower and include the following:
   a. Fusible disconnect switch.
   b. Pressure switch.
   c. Hand-off-auto selector switch.
   d. Pilot light.
   e. Running period timer.

D. Accessories and Specialties: Match pressure-maintenance-pump suction and discharge ratings as required for pump capacity rating. Include the following:
1. Circulation relief valve.
2. Suction and discharge pressure gauges.

E. Pressure-Maintenance-Pump Characteristics and Specialty Data:
1. Plan No.: JP-1.
2. Rated Capacity: 10 GPM.
3. Total Rated Head: 55 PSI.
4. Max. Pump Speed: 3,500 rpm.
5. Minimum Electric-Motor Driver Size: 1.0 horsepower, 3,500 rpm, single phase, 60-Hz.

2.06 PRESSURE GAGES

A. Description: UL 393, 3-1/2- to 4-1/2-inch- (90- to 115-mm-) diameter dial with range of 0- to 300-psig (0- to 2,070-kPa) minimum. Include caption "WATER" on dial face.
1. Manufacturers:
   a. AGF Manufacturing Co.
   b. AMETEK, Inc.; U.S. Gauge.
   c. Brecco Corporation.
   d. Dresser Equipment Group; Instruments Div.
   e. Marsh Bellofram.
   f. WIKA Instrument Corporation.

2.07 FIRE PUMP HOUSE

A. Design Criteria:
1. Codes and Standards: The structure design and manufacture shall, as a minimum, conform to ASCE (American Society of Civil Engineers) current edition of "Minimum Design Loads for Buildings and Other Structures" and to the MBMA (Metal Building Manufacturers Association) "Recommended Design Practices Manual." Building shall be manufactured and built to satisfy current editions of the International Building Code (IBC), and the National Electrical Code (NEC). Building

Manufacturer shall supply plans and calculations stamped by a registered professional engineer for the State of Florida, and are responsible for obtaining any Florida Industrial Building Commission Approvals and Third Party Inspections if required by the State of Florida.

2. Building shall be designed for the following loads, in addition to the stationary weight of the building. Reduction of loads due to tributary loaded areas will not be permitted.
3. The vertical Live Load of the building shall not be less than 40 pounds per square foot applied at the horizontal projection of the roof.
4. The horizontal Wind Load of the building shall not be less than 140 mph and shall be distributed and applied in accordance with the applicable edition of the Metal Building Manufacturer's Association (MBMA) publication titled, "Low Rise Building Systems Manual."
5. The seismic criteria for the building shall be not less than seismic zone 1.
6. All combining and distributing of auxiliary equipment loads imposed on the building system shall be done in accordance with the "Low Rise Building Systems Manual."
7. Building manufacturer shall provide the Engineer with complete design certification, signed and sealed by a registered professional engineer.
8. Color of building panels shall be selected by Owner from standard manufacturers' available colors.

B. Framework: The building shall have a complete, internal, self-supporting, structural steel frame which does not rely on the exterior panels or roof cover panels for its structural strength or framing. The building framework shall include 8 to 16-gauge, cold-formed, galvanized steel structural members. Building framework shall have a flush wall, post and beam format with girts and purlins, and full trusses on both end walls which easily allows for future expansion and/or modifications. Wall and ceiling structural support system are to be designed to provide load carrying capability for anticipated equipment loads using 16-gauge galvanized steel hat channels behind liner panel for reinforcement as needed, with locations shown on approval drawings. Roof shall have 8 to 14-gauge solid web hot rolled steel trusses.

C. Insulation: Exterior walls shall have a minimum of 3.5 inches, fiberglass batt insulation and a vapor barrier. The ceiling shall have a minimum of 6 inches of insulation and a vapor barrier. The insulation system shall provide a minimum of R-14 in the walls, R-21 above the ceiling.

D. Roof:

1. Roof pitch shall be 1 inch in 12 or greater and shall have a covering of overlapping, 26-gauge, "Multi-Rib" ribbed steel panels with a baked-on Kynar 500, PVDF resin-based finish over a galvalume substrate, in manufacturer's standard colors. Overlapping roof panels shall be installed with appropriate self-tapping fasteners with integral gaskets.

Standing seam roof panels shall be of galvalume steel, with a baked-on Kynar 500, PVDF resin-based coating and shall have no visible fasteners on main run. Roof shall include a matching, die-formed ridge cap, and a fully supported 3-inch overhang. Properly sized attic space ventilation shall be provided. Roof shall be a gable or one way slope with pitch direction as indicated on Drawings. Heavy duty steel lift eyes shall be supplied and mounted to the roof trusses as needed for lifting the building.

E. Exterior Walls: The exterior walls shall be 26-gauge "Multi-Rib" ribbed steel panels with a PVDF resin-based finish over a galvalume substrate in manufacturer's standard colors. Exterior siding panels shall be overlapped and installed with appropriate self-tapping fasteners with integral gaskets, and shall be removable without any disturbance to interior panels. Butted seams are not allowed. All openings in walls are to be structurally framed, sleeved, trimmed, and provided with external drip caps. Repair or replacement of exterior panels must be able to be done entirely from the building exterior.

F. Exterior Trim: The exterior trim package shall include stepped or boxed eave, rake, fascia, base, corner, jamb, and header trim in, 26-gauge galvalume material, with Owner's choice of standard KYNAR colors.

G. Interior Finish: The building's interior walls and ceiling shall be lined with flush-fit 22-gauge, roll-formed liner panels, with concealed fasteners and a baked-on white polyester finish over G-90 galvanized substrate. The building interior shall feature a complete matching trim system including base, jamb, header, and ceiling trim. Liner shall be reinforced with 14-gauge hat channels mounted vertically as needed for heavy wall mounted items.

H. Fasteners, Adhesives, and Sealants: The fasteners, adhesives, and sealants utilized shall be of types approved for use on this type of structure, as required by the appropriate agency or governing body.

I. Closures: Matching, pre-molded, closed cell elastomer closures provided by the siding and roof panel manufacturer shall be installed according to the manufacturer's recommendations at the eave line, beneath the roof panels, and where the trim meets the wall panels.

J. Hollow Metal Doors:
1. All doors shall be 1-3/4-inch thick, flush type. Door panels shall be nominal 20-gauge galvanized steel, reinforced by lamination to a honeycomb core enclosed with 16-gauge end channel. The hinge reinforcements shall be nominal 17-gauge and the lock reinforcements shall be nominal 16-gauge.
2. Door frames shall be 4-3/4-inch deep, double rabbeted type, of nominal 16-gauge galvanized steel.

3. Doors and frames shall be factory painted with one coat of baked on primer, and finished to match building color. All doors shall be preassembled in their frames and hardware installed and tested prior to shipment. Field installation of single leaf door units shall not require any frame assembly, or door hanging.

K. Door Hardware:
1. Door Hardware shall Consist of:
a. Three 4-1/2-inch by 4-1/2-inch steel hinges per ANSI #A8132 (Old Govt. Spec. FFH-116C, Type T2127) US26D (626) Satin Chrome Finish with non-removable pins.
b. Three 11/16-inch wide by 5/8-inch high extruded aluminum threshold. (Out swing.)
c. 3/16-inch by ½-inch polyurethane and vinyl weather-stripping.
d. Mortise cylinder lockset per ANSI A156.13, Series 100, Grade 1, Function F13 (Old Govt. Spec. 86B) US26D (626) Satin Chrome Finish.

L. Wall Openings: The building manufacturer shall supply all necessary framing and connectors to structurally replace the panels removed by any wall opening. All trim and flashing required to make weather-tight the unit placed in any opening shall be provided by the supplier of the unit being installed.

M. Building Manufacturer shall be Parkline Inc., Windfield, West Virginia or approved equal.

2.08 GROUT

A. Description: ASTM C1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
1. Properties: Non-staining, non-corrosive, and nongaseous.
2. Design Mix: 5,000-psi (34.5-MPa), 28-day compressive strength.

2.09 SOURCE QUALITY CONTROL

A. Test and inspect fire pumps with their controllers according to NFPA 20 for certified shop tests.

B. Verification of Performance: Rate fire pumps according to requirements indicated.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine areas, concrete bases, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of fire pumps.

B. Examine roughing-in for fire-suppression piping to verify actual locations of piping connections before fire-pump and pump house installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 FACTORY PREFABRICATION AND TESTING

A. All the equipment, except the test header and hose valves, shall be mounted on an open I-beam skid. All piping, valves, fittings, and sensing lines shall be firmly attached to the skid by structural steel supports. All electrical wiring between controllers and motors shall be complete and tested. The entire package system will be hydrostatically tested at the factory prior to shipment. Additionally, all equipment will be tested in accordance with the requirements of NFPA, UL and FM.

3.03 FIRE PUMP HOUSE

A. Install fire pump house per manufactures instructions. Fire pump house shall include the following accessories:
   1. Electric heater, 5 KW with thermostat.
   2. Exhaust fan (16 inch) with thermostat.
   3. Two fluorescent light fixtures, each fixture indicated shall contain two four foot long tubes.
   4. Wall mounted electrical receptacles, minimum of four.
   5. Lighting panel electrical box with 7.5 KVA transformer. Panel shall contain a minimum of six 15 amperes circuit breakers.
   6. Exterior weather-proof mercury vapor light fixture mounted above door.
   7. Motorized ventilation damper.
   8. Two emergency lights with battery packs.

B. Cast-in-place concrete materials to fill skid are specified in Division 3, Concrete.

3.04 INSTALLATION

A. Install and align fire pump, pressure-maintenance pump, and controller according to NFPA 20.

B. Grout base under fire pump and driver.

C. Fill skid with concrete per manufacturer's recommendations.

D. Connect suction and discharge piping to site piping as required.

E. Fill fuel system according to NFPA 20.

F. Install piping accessories, hangers and supports, anchors, valves, meters and gages, and equipment supports.

G. Refer to Division 15, Mechanical for basic piping installation and joint construction.

H. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.

3.05 ALIGNMENT

A. Align fire-pump and driver shafts after complete unit has been leveled on concrete base, grout has set, and anchor bolts have been tightened.

B. After alignment is correct, tighten anchor bolts evenly. Fill base plate completely with grout, with metal blocks and shims or wedges in place. Tighten anchor bolts after grout has hardened. Check alignment and make required corrections.

C. Align piping connections.

D. Align pump and driver shafts for angular and parallel alignment according to HI 1.4 and to tolerances specified by manufacturer.

3.06 CONNECTIONS

A. Piping installation requirements are specified in Division 2 of the project technical specifications. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to packaged fire pump and equipment to allow service and maintenance.

C. Connect water supply and discharge piping to packaged fire pump.

D. Connect relief-valve discharge to point of disposal.

E. Connect fire-pump controllers and valve supervisory switches to building fire-alarm system. Refer to Division 13, Special Construction.

F. Ground equipment according to Division 16, Electrical.

G. Connect wiring according to Division 16, Electrical.

3.07 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust packaged fire pump system per NFPA 20, including connections. Service representative shall report results in writing. At a minimum three (3) - 8 hour days of start up services shall be provided.

B. Manufacturer's Field Service Representative shall perform field tests for fire pump when installation is complete. He/she shall comply with operating instructions and procedures in NFPA 20 to demonstrate compliance with requirements. Where possible, he/she shall field correct malfunctioning equipment, and then retest to demonstrate compliance. He/she shall replace equipment that cannot be satisfactorily corrected or that does not perform as indicated, and then retest to demonstrate compliance. He/she shall verify that the fire pump system performs as indicated.

C. Manufacturer's Field Service Representative shall perform the Following Field Tests and Inspections and Prepare Test Reports:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Final Checks before Startup: Perform the following preventive-maintenance operations and checks:
      a. Lubricate oil-lubrication-type bearings.
      b. Remove grease-lubrication-type bearing covers, flush bearings with kerosene, and clean thoroughly. Fill with new lubricant according to manufacturer's written instructions.
      c. Disconnect coupling and check electric motor for proper rotation. Rotation shall match direction of rotation marked on pump casing.
      d. Verify that pump is free to rotate by hand. If pump is bound or if it drags even slightly, do not operate until cause of trouble is determined and corrected.
   3. Starting Procedure for Pumps is as Follows:
      a. Prime pump by opening suction valve and closing drains, and prepare pump for operation.
      b. Open sealing-liquid supply valves if pump is so fitted.
      c. Start motor.
      d. Open discharge valve slowly.
      e. Observe leakage from stuffing boxes and adjust sealing-liquid valve for proper flow to ensure lubrication of packing. Do not tighten gland immediately, but let packing run in before reducing leakage through stuffing boxes.
      f. Check general mechanical operation of pump and motor.

4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Furnish fire hoses in number, size, and length required to reach storm drain or other acceptable location to dispose of fire-pump test water. Fire hoses are for field-acceptance tests only and are not property of Owner.

3.08 CERTIFICATE OF COMPLIANCE

A. To ensure the complete system will function in accordance with the intent of these Specifications, all components, including the fire pump, shall be supplied by the fire pump manufacturer, who shall have complete unit responsibility for the complete system. A Certificate of Compliance shall be provided by the pump manufacturer stating compliance.

3.09 GUARANTEE

A. The system shall be guaranteed against defects in design material and construction for a period of 1 year from the date of final acceptance.

3.10 DEMONSTRATION

A. Manufacturer's Field Service Representative shall train Owner's maintenance personnel to adjust, operate, and maintain fire pumps, drivers, controllers, and pressure-maintenance (jockey) pumps.

END OF SECTION

SECTION 02428
GRAVITY WASTEWATER SEWERS & APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The Contractor shall furnish and install all gravity sewer lines, fittings, and appurtenances required for a complete system as shown on the drawings and specified herein.

B. The work shall also include such connections, reconnections, temporary service, and all other provisions in regard to existing sewer operations and modifications as is required to perform the new work.

C. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. Only those materials included in the Approved Materials and Equipment List shall be installed unless previously approved by the Utilities Division (UD).

D. All materials shall be new unless specifically called for otherwise and approved by the UD.

1.02 SECTION INCLUDES:

A. This Section consists of the installation and furnishing of all materials, equipment, and accessories to be used in the construction of the gravity sewage collection system.

1.03 RELATED SECTIONS:

A. Section 02315 - Excavation.

B. Section 02320 - Trench Backfill.

C. Section 03300 - Cast-in-Place Concrete

1.04 SHOP DRAWINGS:

A. Actual catalog data, brochures and descriptive literature will not be required for items of standard usage which are listed in the Approved Materials and Equipment List.

B. Any specialty item not shown in the Approved Materials and Equipment List will require a complete shop drawing submittal.

C. The Engineer may at any time require the Contractor to provide a complete detailed shop drawing submittal for any material which, in the Engineer's opinion, may not be in compliance with the Citrus County Utility Specifications.

1.05 REFERENCES:

A. AWWA – C110, C111, C115, C150, C151, C153, C900, C905, C907 & M23.

B. ANSI – A21.10, A21.11, A21.15, A21.50, A21.51, A21.53 & B16.1.

C. ASTM – A48, A193, A193, A240, A307, A536, C150, C443, C478, D1598, D1599, D1784, D2000, D2241, D3034, D3139, D3212, D3752, F477, F679, F913 & F1336.

D. CCDWR MSCSWE: Citrus County Department of Water Resources, Utilities Division "Minimum Standards & Construction Specifications For Water & Wastewater Systems", Latest Edition, including all amendments. .

E. FDOT SSRBC: "Standard Specifications for Road and Bridge Construction", State of Florida, Department of Transportation, - Latest Edition, including all amendments.

F. UD: Citrus County Department of Water Resources, Utilities Division

PART 2 - PRODUCTS

A. All material shall be free from defects impairing strength and durability, shall be of the best commercial quality for the purpose specified, shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

2.01 PIPE

A. Pipe for gravity sewer lines shall be ductile iron or polyvinyl chloride (PVC) as shown on the drawings and as herein specified.

B. Pipe to be installed underground shall be PVC push-on joint type or ductile iron, where applicable.

C. Pipe installed above ground shall be restrained joint ductile iron pipe or flanged ductile iron pipe as described in these specifications.

D. PVC pipe shall not be used in above ground applications.

E. Pipe shall be cut to length as required to fit installation conditions.

F. Pipe sizes and applications shall conform to the following chart.

PIPE	PIPE SIZE	JOINT TYPE	ACCEPTABLE BURY DEPTHS	APPLICATION
Ductile Iron (epoxy coated interior)	8 inches and larger	Mechanical joint, push-on joint, flanged joint, ball joint, etc.	*	gravity mains and laterals above ground or otherwise exposed in r/w and easements
PVC DR18	8 inches through 48 inches	Push-on joint	*	gravity mains & laterals & jack and bore carrier pipe in r/w and easements
PVC SDR 26	8 inches thru 24 inches	Push-on joint	*	gravity mains & laterals in r/w and easements
PVC SDR35	8 inches thru 27 inches	Push-on joint	*	gravity mains & laterals in r/w only
Steel	6 inches and larger	Welded	*	casing only

*Allowable depths vary based on earth load, vehicle loads, trench loads, and laying conditions – all as determined by the Engineer and specified and/or shown on the Construction Plans.

G. DUCTILE IRON PIPE

1. Ductile iron pipe wall thickness and pressure class shall conform to ANSI Specification A21.50 (AWWA C150) and ANSI A21.51 (AWWA C151) with pressure class 150 as a minimum.
2. Pipe shall be clearly marked with the name of the manufacturer, location of the foundry, pressure rating, thickness or pressure class, nominal pipe diameter, weight of pipe without lining, maximum depth of bury and length.
3. All pipe furnished by the manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data.
4. All ductile iron pipe shall be externally bituminous coated and internally epoxy lined as herein specified.
5. All ductile iron pipe shall be color coded green by field painting a green stripe, 3 inches wide, along the crown of the pipe barrel.

H. POLYVINYL CHLORIDE (PVC) PIPE

1. Each length shall be clearly marked with the name of the manufacturer, location of the plant, pressure rating, nominal pipe diameter and length.
2. All PVC sanitary sewer pipe shall be green. Receiving storage and handling of PVC pipe shall be in accordance with chapter 6 of AWWA Manual M23.

3. PVC 1120, CLASS 235, DR 18 PIPE
   a. Pipe shall conform to AWWA Standard C900 for 8 inch through 12 inch diameter pipe, and AWWA Standard C905 for 14 inch through 36 inch diameter pipe. All pipe shall be hydrostatically proof tested at the factory in conformance with UNI-B-11 standards.
   b. In case of conflict between standards specified herein, the requirements of AWWA Standard C900 and C905 shall prevail.
   c. Pipe is to be manufactured to ductile iron pipe equivalent outside diameters.
   d. The pipe material shall be clean, virgin, National Sanitation Foundation approved, Class 12454-B PVC compound conforming to ASTM resin specification D1784.
   e. Pipe shall be rated for potable water and shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3139.
   f. Elastomeric seals shall meet ASTM F477.
   g. The pipe shall be designed to pass without failure a sustained pressure test of 500 psi in conformance with ASTM D1598 and a quick burst test of 755 psi in conformance with ASTM D1599.
4. PVC 1120, CLASS 160, SDR 26 PIPE
   a. Pipe shall conform to ASTM D3034 for sizes 8 inch thru 15 inch diameter pipe and ASTM F679 for 18 inch through 36 inch diameter pipe.
   b. The pipe material shall be clean, virgin, National Sanitation Foundation approved, Class 12454-B PVC compound conforming to ASTM resin specification D1784 with wall thickness T-1.
   c. Pipe shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3212.
   d. Elastomeric seals shall meet ASTM F477 or ASTM F913.
   e. The pipe shall be designed to pass without failure a sustained pressure test of 340 psi in conformance with ASTM D1598 and a quick burst test of 400 psi in conformance with ASTM D1599.
5. PVC 1120, CLASS 118, SDR 35 PIPE
   a. Pipe shall conform to ASTM D3034 for sizes 8 inch thru 15 inch diameter pipe and ASTM F679 for 18 inch through 36 inch diameter pipe.
   b. The pipe material shall be clean, virgin, National Sanitation Foundation approved, Class 12454-B PVC compound conforming to ASTM resin specification D1784 with wall thickness T-1.
   c. Pipe shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3212.
   d. Elastomeric seals shall meet ASTM F477 or ASTM F913.

2.03 PIPE JOINTS

A. Type of joint used shall be approved by the Engineer prior to installation.

B. Joints shall be made in accordance with approved printed instructions of the manufacturer and shall be absolutely watertight.

C. MECHANICAL JOINTS

1. All jointing materials for mechanical joints shall be provided by the pipe and/or fitting manufacturer.
2. Material assembly and bolting shall be in accordance with ANSI Specification A21.11 (AWWA C111).
3. All glands shall be made of ductile iron only. Mechanical joint gaskets shall be of a composition suitable for exposure to sewage, sludge or scum within the pipe.

D. PUSH-ON JOINTS

1. DUCTILE IRON
   a. Ductile iron pipe push-on joints shall be in accordance with ANSI Specification A21.11 (AWWA C111). All joint material shall be provided by the pipe manufacturer and installation shall be in accordance with the manufacturer's recommended practice.
2. POLYVINYL CHLORIDE (PVC)
   a. PVC push-on joints shall have a bell type coupling with a thickened wall section integral with the pipe barrel.
   b. Joints for PVC DR18 pipe shall be in accordance with ASTM D3139.
   c. Joints for PVC SDR 26 and SDR 35 shall be in accordance with ASTM D3212.
   d. Elastomeric gaskets shall conform to ASTM F477 for PVC DR 18.
   e. Elastomeric gaskets for SDR 26 and SDR 35 fittings shall conform to ASTM F477 or ASTM F913.

2.04 CORROSION PROTECTION FOR DUCTILE IRON PIPE

A. SPECIFICATION FOR PROTECTO 401 CERAMIC EPOXY LINING OF DUCTILE IRON GRAVITY SEWER PIPE

1. LINING
   a. Clean and abrasive blast the surfaces of the pipe and fittings to be lined.
   b. The lining is to be applied at a nominal 40 mils dry film thickness.
   c. The bell and sockets and spigot ends are to be coated (after the application of the lining) up to 6 inches back from the ends with 6 mils nominal, 10 mils maximum with Protecto Joint Compound.
   d. All work to be performed in accordance with manufacturer's specifications.
2. TOUCH-UP AND REPAIR
   a. Protecto Joint Compound shall be used to touch-up or repair in accordance with manufacturer recommendations.
   b. Do not apply Protecto 401 over Protecto Joint Compound.
3. INSPECTION AND CERTIFICATION
   a. Inspect and certify lining thickness and material in accordance with manufacturer specifications.
4. HANDLING
   a. Protecto 401 lined pipe and fittings must be handled only from the outside of the pipe and fittings.
   b. No forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or laying.

B. EXTERIOR COATING

1. All ductile iron pipe and fittings, except on bridges or as otherwise noted, shall receive an exterior bituminous coating as specified in ANSI A21.51.
2. The finished coating shall be continuous smooth, neither brittle when cold nor sticky when exposed to the sun, and be strongly adherent to the fitting.
3. All bolts, nuts, studs and other uncoated parts of joints for underground installation shall be coated with asphalt or coal-tar prior to backfilling.
4. Pipes crossing under ditches, culverts, rivers, creeks, etc., shall be considered as buried pipe.
5. All ductile iron pipe shall be color coded green as provided under Article 2.1.1 herein.

C. POLYETHYLENE WRAP

1. In areas where soils are corrosive in nature, ductile iron pipe, fittings, valves and other appurtenances shall be protected with polyethylene wrap or tubing.
2. The Contractor shall furnish and install polyethylene tube or wrap for ductile iron pipe at the locations shown on the construction drawings.
3. MATERIAL
   a. The polyethylene material shall meet or exceed the requirements of AWWAC105 in all respects. The wrap shall be virgin, high density polyethylene, 4 mils thick minimum.
   b. The polyethylene wrap shall be white with 2 each 6 inch wide continuous green tapes located at the 2:00 and the 10:00 o'clock position on the pipe.
4. INSTALLATION
   a. Although not intended to be a water-tight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill.
   b. Installation shall be done according to one of the methods described in Section 5.4 of AWWA C105, subject to approval by the engineer and the manufacturer.

2.06 SERVICE LATERAL CONNECTIONS

A. All pipe shall be of the same material as that used for the gravity sewage collection system.

2.07 PRE-CAST CONCRETE MANHOLES

A. Sewage manhole bases, sections and cones shall conform to the requirements of ASTM C478, "Specification for Pre-cast Reinforced Concrete Manhole Sections" with the exception of Section 10(a), except as modified herein.

B. Cement shall meet the requirements of ASTM C150, "Specification for Portland Cement Type H". Concrete shall meet the minimum requirements for Class "A" as specified in Sub-Section 237 in the CCDWR MSCSWE.

C. Minimum wall thickness shall be 1/12 the inside diameter of the manhole in inches plus 1 inch.

D. The required minimum strength of concrete shall be confirmed by making and testing 3 standard cylinders at seven days and twenty eight days in accordance with Specification 03300.

E. Rings shall be custom-made with openings to meet indicated pipe alignment conditions and invert elevations shown on the drawings.

F. BASES

1. Bases for concrete manholes shall be cast integrally with the bottom manhole section.

G. JOINTS

2. Joints shall be tongue and groove configuration formed with machined castings.
3. The joint shall be sealed using an approved pre-molded plastic joint sealer.
4. Prior to placement of the joint sealer the joint surfaces shall be primed in accordance with the recommendations of the sealer manufacturer.
5. Manhole sections exhibiting cracks or chipping along joint surfaces shall be rejected.
6. No field repairs prior to or during installation will be accepted.

H. COATING/LINING

1. With the exception of joint contact surfaces and the interior surfaces of all openings to receive the sewer pipe and a 1-inch annular ring around the interior and exterior of said openings, the interior and exterior surfaces of each concrete manhole, including adjusting rings, shall be given 2 coats of coal tan epoxy coating.
2. Total minimum dry film thickness shall be 16 mils.
3. The coating materials shall be applied by brush or spray and in accordance with the instructions of the manufacturer. Each coat shall be different in color with the final coat black, with a minimum dry film thickness of 8 mils per coat.
4. Time shall be allowed between coats to permit sufficient drying so that the application of the second coat has no effect on the first coat.
5. Special precaution shall be taken not to coat joint contact surfaces.

I. FLEXIBLE MANHOLE CONNECTOR

1. For connecting the sewer pipe to the pre-cast concrete manhole, a flexible pipe to manhole connector shall be used.
2. The connector shall be the sole element to assure a flexible watertight seal of the pipe to the manhole, see approved list of materials for water & wastewater.
3. MATERIAL
   a. The Neoprene-EPDM material the connector is manufactured from shall conform to ASTM C443 and shall be a minimum of 3/8 inches (9.4mm) thick or greater.
   b. The material shall be resistant to ozone, weathering, aging, chemicals, including acids, alkalis, animal and vegetable fats, oils and petroleum products.
4. BANDS
   a. The stainless steel band and screw assembly shall be a totally non- magnetic series 304 stainless steel.

5. CONNECTOR
   a. The connector shall be of a size specifically designed for the specified pipe material and size.
   b. The connector shall be installed in the manhole wall by the pre-cast manufacturer in strict accordance with the recommendations of the connector manufacturer.

2.09 CAST IRON MANHOLE FRAMES AND COVERS

A. Cast iron sewage manhole frames and covers shall be of the type as shown in Citrus County Approved Materials.

B. Manhole cover shall be 22-3/4 inches in diameter.

C. Castings shall be made of good quality, strong, tough, even grained cast iron and shall be smooth, free from scale, lumps, blisters, sandholes and defects of any nature which would render them unfit for the service for which they are intended.

D. They shall be thoroughly cleaned.

E. Castings shall meet the requirements of ASTM A48, "Specifications for Gray Iron Castings, Class No. 30, or Grade 65-45-12" and Ductile Iron meeting the requirements of ASTM A536, "Standard Specification for Ductile Iron Castings".

F. In either case, manhole frame and cover shall be designed to withstand an HS20-44 loading defined in the AASHTO Specifications.

G. Frames and covers shall be machined or ground at touching surfaces so as to seat firmly and prevent rocking.

H. Any set not matching perfectly shall be removed and replaced at no additional cost.

I. Cover shall set flush with rim of frame and shall have no larger than an 1/8 inch gap between frame and cover.

2.10 CONCRETE ADJUSTMENT RINGS (manhole collars)

A. Concrete adjustment rings shall be 4000 psi concrete, Type II cement. Minimum height of rings shall be 3 inches.

B. Maximum height shall be 18 inches. Rings shall be grouted in place.

2.11 MATERIAL WARRANTY

A. PIPE
1. The manufacturer of materials furnished on the project shall supply to Citrus County a one (1) year unconditional warranty.
2. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications.
3. This warranty is in addition to any warranty required for pipe linings specified.

B. MANHOLES
1. The manufacturer of materials furnished on the project shall supply to Citrus County, a one (1) year unconditional warranty.
2. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications.

PART 3 - EXECUTION

3.01 REFERENCE POINTS AND LAYOUT

A. The Contractor shall be responsible for setting all grade lines and levels, centerline of construction, and locating property lines.

B. The Contractor or Contractors surveyor will provide a bench mark.

C. Any reference points, points of intersection, property corners, or bench marks, which are disturbed during construction shall be restored by a Land Surveyor registered to practice in the State of Florida, and all costs thereof shall be borne by the Contractor. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes.

3.02 HANDLING AND CUTTING PIPE

A. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating.

B. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

C. In any pipe showing a distinct crack in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved by Citrus County, may be cut off before the pipe is laid so that the pipe used may be perfectly sound.

D. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.

E. Except as otherwise approved, all cutting shall be done with a power driven cut off saw.

F. All cut ends shall be examined for possible cracks caused by cutting.

3.03 PIPE INSTALLATION

A. The pipe laying shall proceed upgrade, beginning at the lower end of the sewer, with all bell ends upgrade.

B. In no case shall the pipe be walked on either before or after the joints have been made.

C. Extreme care shall be taken to keep the pipe in exact alignment and elevation.

D. Pipe shall be laid to conform accurately to the lines and grades indicated on the drawings.

E. It shall be the Contractors responsibility to locate all underground utilities in advance of construction, to insure that no conflicts occur with the proposed line and grade.

F. If approved by the Engineer, minor changes in the alignment but not the grade will be permitted to avoid underground facilities, provided that straight alignment can be maintained between manholes. However, if a conflict is found between an existing utility and proposed grade, the Contractor is to furnish the Engineer all pertinent information so that remedial design can be performed.

G. LAYING AND JOINTING

1. The pipe shall be laid on an unyielding foundation with uniform bearing under the full length of the barrel of the pipe.
2. Suitable excavations shall be made to receive the bell of each pipe, which shall be carefully laid true to line and grade.
3. All adjustments to line and grade must be made by scraping away or filling in under the barrel of the pipe and not by wedging and blocking up any portion of the pipe.
4. The spigot end of each pipe shall abut against the base of the socket of the adjacent pipe in such a manner that there will be no unevenness of any kind along the bottom halves of the pipes.
5. Just before jointing the pipes, the mating ends shall be thoroughly cleaned of all dirt, debris, and foreign material.
6. The pipe shall be jointed in accordance with the recommendations of the manufacturer of the pipe and gasket.
7. The trench must be dewatered when joints are made and kept dewatered with a dry trench bottom, until pipe trench has been backfilled.
8. The pipe shall not be driven down to grade by striking it with any unyielding object.
9. The Contractor shall take all necessary precautions to prevent flotation of the pipe due to flooding of the trench.

H. PIPE COVER

1. The cover over all piping shall be 30 inches minimum in unpaved areas and 36 inches in paved areas.

I. JOINTING PVC TO VITRIFIED CLAY PIPE

1. Unless specifically indicated otherwise, connections of PVC to vitrified clay pipe in the run of the sewer line shall be made with an approved cast coupling.

J. PLUGS

1. Openings such as stubs, tees, or services along the lines shall be securely closed by means of an approved plug that fits into the bell of the pipe and is recommended by the pipe manufacturer.
2. This plug shall be installed in such a manner that it may be removed at some future time without injury to the pipe itself.
3. At the close of each day's work, and at other times when pipe is not being laid, the end of the pipe shall be temporarily closed with a plug.
4. All plugs must be water tight.

K. CLEANING

1. All necessary precautions shall be taken to prevent the entrance of mud, sand or other obstructing material into the pipelines.
2. As the work progresses, the interior of the sewer shall be cleaned of all dirt, and foreign material.
3. The Contractor shall flush all sewer lines after installation with clean water, prior to final inspection, to assure complete removal of all debris and foreign material.

L. BEDDING AND BACKFILL

1. Immediately after the pipe has been jointed and inspected, sufficient backfill shall be placed to protect the pipe adequately from injury and movement.
2. Unsuitable material shall be removed and replaced with AASHTO Class A-3 soil upon approval of the Engineer.
3. A-3 soil and native material backfilled shall be compacted to the requirements of Specification 02320.

3.04 GRAVITY SEWER MAIN AND WATER MAIN SEPARATION REQUIREMENTS

A. HORIZONTAL SEPARATION BETWEEN PARALLEL LINES

1. All new and relocated gravity sewer mains shall be located at least six feet (preferably ten feet) horizontally from water mains.
2. If the bottom of a potable water main is located 6 inches minimum above the top of a gravity type sewer main, the horizontal distance can be reduced to 3 feet minimum.
3. The horizontal distance between a potable water main and an onsite sewage treatment and disposal system shall be ten feet minimum.
4. All distances are measured from outside pipe edge to outside pipe edge.

B. VERTICAL SEPARATION BETWEEN CROSSING LINES

1. Any new or relocated gravity sewer mains shall cross above or below (preferred) the water mains with a minimum vertical distance of 12 inches between the outside of the gravity sewer and the outside of the water mains.
2. Such crossings shall be arranged so that all pipe joints are equidistant from the point of crossing with no less than ten feet between any two joints (or alternatively, the mains at such crossings shall be placed in sleeves to obtain the equivalent of the ten-foot separation between joints).

3.06 LATERAL CONNECTIONS

A. Types of lateral connections shall be as shown on the drawings.

B. Although the general location of lateral connections may be shown on the drawings, the actual location shall be determined by the Contractor, subject to approval by the Engineer.

C. Each lateral connection shall be accurately recorded by stationing and elevation at the ROW line on the As-Built drawings which shall be furnished to the Engineer.

D. Unless authorized by the Engineer in writing, lateral connections shall not be made into new or existing dead end manholes.

E. All lateral connections shall be terminated at the property line unless indicated otherwise on the drawings or directed otherwise by the Engineer.

F. All active lateral connections on sanitary sewers to be replaced shall be connected to the new sanitary sewer.

G. Contractor shall be responsible for locating lateral connections prior to construction.

H. MARKING SERVICE LINES

1. An "S" shall be cut in the curb directly over each service line or in the street side of a sidewalk where no curb is available.
2. In the event neither curb nor sidewalk is available, the Contractor shall place a 2-inch by 2-inch pressure treated stake on the property line directly over the service line.
3. The stake shall be topped with red paint extending 12 inches down the stake from the top.

3.07 STUB-OUTS

A. Where shown on the drawings, stub-outs shall be provided for the connection of future sewer lines to manholes.

B. The end of each stub out shall be provided with a bell end which shall be closed by an approved watertight plug as previously specified.

C. Each stub-out shall be accurately referenced to the center of the manhole, and the actual invert elevation of each end of the stub out shall be accurately recorded on the As-Built drawings.

3.08 YARD PIPING

A. Yard piping shall be defined as the sewer service piping and appurtenances privately owned and located entirely on private property. All yard piping shall conform to all applicable building codes. No work shall be done on private property without written consent of the property owner (Temporary Construction Easement). Contractor must obtain plumbing permit prior to work.

3.09 FIELD TESTING

A. All work constructed shall be subject to visual inspection for faulty alignment, defects, slope, or leaks.

B. Any such deviation or omission shall be corrected at once.

C. All tests shall be made by the Contractor who shall provide necessary equipment for testing and lamping the system in the presence of, and under the supervision and instructions of the Citrus County's representative.

D. All costs for testing defined below shall be borne by the Contractor.

E. VIDEO TAPING REQUIREMENTS

1. SPECIFICATIONS FOR TELEVISION TAPE REPORT ON SANITARY SEWERS
   a. STD VHS format in color with data view (accurate footage displayed on video)
   b. All pertinent data recorded in audio on the tape to include:
      i. Subdivision name and phase number.
      ii. Manhole numbers (these numbers must match manhole numbers on "as built" drawings).
      iii. Date
      iv. Size and material of pipe.
      v. Service connection locations right or left
      vi. All distances between manholes.
      vii. Locations of suspected and obvious pipe deficiencies (i.e. bad joints, breaks or leaks, etc.)
   c. All pipe shall have a deflection test using a 7-1/2% (go no go) test mandrel of appropriate size which shall be visible on video at all times.
   d. The contractor will also provide a written television report (indicating manhole numbers) that will accompany the videotape. This written report must include:
      i. Manhole numbers (these numbers must match manhole numbers on "as built" drawings).
      ii. Service connection locations right or left.
      iii. Reference to service connection locations out of manholes.

iv. Locations of suspected and obvious deficiencies (i.e., bad joints, breaks or leaks, etc.).
v. Depth of each manhole.
vi. Actual measured distance (on ground) between manholes.

e. All visual and television inspections shall be completed and approved by Citrus County Utilities Division (UD) prior to the placing of any asphalt. An inspector from the UD must witness the taping. The UD shall be notified at least 48 hours in advance for scheduling. Television tapes must clearly show details of structural defects, misalignments and infiltration. The Contractor, regardless of the test allowances shall repair all known or indicated breaks. Faulty sections of sewer lines or manholes rejected by the Engineer shall be removed and relayed by the Contractor. Sunken manholes will not be accepted. All manhole inverts must be completed prior to videoing.

F. DEFORMATION/DEFLECTION

1. Pipe shall be inspected for deformation or deflection.
2. Any pipe found to be deformed and/or deflected in excess of 7.5% of the nominal diameter of the pipe shall be removed and replaced with new pipe at no additional cost.
3. Results of the tests shall be submitted to Citrus County.
4. The cost of this service shall be included in the unit price bid for the particular item to which it is related.

3.10 PRE-CAST CONCRETE MANHOLES

A. SETTING SEWAGE MANHOLE BASES

1. Sewage manhole bases shall be set level on a bedding consisting of 6 inches of size 57 stone.

B. INSTALLING SECTIONS

1. Pre-cast concrete sections shall be set so the manhole will be vertical and with sections in true alignment.
2. Joint surfaces of the base or previously set section shall be sealed with pre-molded plastic joint sealer.
3. Joints shall be pre-primed.

C. METALLIC NON-SHRINK MORTAR

1. All holes in sections used for handling shall be thoroughly plugged with non-shrinking mortar or grout applied and cured in strict conformance with the manufacturer's recommendations.
2. The mortar shall be finished smooth and flush with the adjoining interior and exterior manhole wall surfaces.

D. GRADE ADJUSTMENT

1. For grade adjustment in setting the manhole frame concrete adjustment rings shall be used on top of manhole slabs and pre-cast concrete manhole cones in accordance with the drawings standard details.

E. SETTING MANHOLE FRAMES

1. Sewage manhole frames and covers shall be set to conform accurately to the finished ground or pavement surface as established by the Contract Drawings, unless otherwise directed by the Engineer.
2. Frames on manhole cones shall be set concentric with the masonry and in a full bed of mortar so that the space between the top of the manhole and the bottom flanges of the frame shall be completely filled and made water tight.
3. A ring of mortar at least 1-inch thick and pitched to shed water away from the frame shall be placed around the outside of the bottom flange.
4. Mortar shall extend to the outer edge of the concrete adjustment rings and shall be finished smooth and flush with the top of the flange.

F. BACKFILL

1. BACKFILL MATERIAL
   a. Unless shown otherwise on drawings and approved by the Engineer, sand, crushed stone, or pea gravel shall be used for backfill around the manhole for a minimum distance of one foot from the outside surface and extending from the bottom of the excavation to the top of the reducer section. In areas of high groundwater, crushed stone or pea gravel shall be used around manhole until backfill reaches a height of 6" above high groundwater level.
   b. Suitable material chosen from the excavation, and approved by the Engineer may be used for the remainder of the backfill.
   c. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction.

2. BACKFILL PROCEDURE
   a. Backfill shall be placed in layers of not more than 12 loose inches and mechanically tamped to 100% of the maximum density as determined by AASHTO T-99, Method C unless otherwise approved by the Engineer.
   b. Flooding will not be permitted. Backfill shall be placed in such a manner as to prevent any wedging action against the fiberglass manhole structure.

G. CONCRETE

1. CONCRETE BOTTOM
   a. Concrete may be used to form bench area and invert. Concrete may also be used on top of anti-flotation ring and around reducer section as required for buoyancy.

3.12 FLOW CHANNELS

A. Flow channels in the manhole base shall be formed of Class "C" concrete, while the manhole is under construction.

B. Flow channels shall be solid concrete or concrete with solid filler blocks.

C. No rubble shall be allowed.

D. Cut off pipes at inside face of the manhole and construct the invert to the shape and size of pipe indicated.

E. All inverts shall follow the grade of the pipe entering the manhole.

F. A change in direction of the sewer and entering branch or branches shall be laid out in smooth curves of the longest possible radius which is tangent to the center lines of adjoining pipelines.

3.13 DROP INLETS

A. Where shown on the drawings, drop inlets to the manhole shall be constructed as shown on the Citrus County Standard Details and specified herein.

END OF SECTION

SECTION 02429
WASTEWATER FORCE MAINS & APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The Contractor shall furnish and install a force main piping system, complete, tested and ready for operation.

B. The work shall also include such connections, reconnections, temporary service and all other provisions in regard to the existing operation and modification as is required to perform the new work.

C. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated.

D. Only those materials included in the approved materials and equipment list shall be installed, unless otherwise specified or directed. All materials shall be new unless specifically called for otherwise.

1.02 SECTION INCLUDES:

A. Installing and furnishing materials, equipment, and accessories for construction of sanitary sewer force main and appurtenances.

1.03 RELATED SECTIONS:

A. Section 02315 – Excavation

B. Section 02320 – Trench Backfill

C. Section 03300 – Cast-in-Place Concrete

1.04 SHOP DRAWINGS:

A. Actual catalog data, brochures and descriptive literature will not be required for items of standard usage that meet the requirements of these specifications.

B. Any specialty item not shown in "water and sewer approved materials" list will require a complete shop drawing submittal.

C. The Engineer may at any time require the Contractor to provide a complete detailed shop drawing submittal for any material which, in the Engineer's opinion, may not be in compliance with these specifications.

1.05 REFERENCES:

A. AWWA – C110, C111, C115, C150, C151, C153, C206, C600, C900, C905, C907 & M23

B. ANSI – A21.10, A21.11, A21.15, A21.50, A21.51, A21.53 & C110

C. ASTM – A193, A194, A240, A380, A536, D1598, D1599, D17984, D1785, D2241, D2564, D2672, D2837, D2855, D3139 & F477

D. CCDWR MSCSWE: Citrus County Department of Water Resources, Utilities Division "Minimum Standards & Construction Specifications For Water & Wastewater Systems", Latest Edition, including all amendments.

E. FDOT SSRBC: "Standard Specifications for Road and Bridge Construction", State of Florida, Department of Transportation, - Latest Edition, including all amendments.

F. UD: Citrus County Department of Water Resources, Utilities Division.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Packing and Shipping:
1. Ship pipe to site with wood lagging between pipes to prevent contact of pipe surfaces.
2. Pack fittings, jointing materials and piping accessories in suitable containers to prevent damage when shipped to site.

B. Acceptance at Site:
1. Carefully examine pipe and related materials delivered to site for defects and compliance with specifications.
2. Reject all defective pipe, fittings, and materials and remove from site.
3. Seal ends of pipe and fittings with dust-tight cover before shipment to prevent foreign matter entering pipe and fittings.

C. Storage and Protection:
1. Store pipe, fittings and accessories in protected areas on site to prevent damage and weathering before installation.
2. Prevent damage to pipe, fittings and accessories during unloading and storage.
3. Do not handle pipe find fittings by hooks inserted in ends.
4. Replace pipe and fittings in which lining has been damaged. Repair small and readily accessible damage to the lining when acceptable to the ENGINEER.
5. Repair damaged exterior coatings before installation of pipe, fitting, or accessory.
6. Store joint lubricant in closed containers and keep clean.

PART 2 - PRODUCTS

All material shall be free from defects impairing strength and durability, shall be of the best commercial quality for the purpose specified, shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

2.01 PIPE

A. Pipe for force mains in sizes up to and including 48 inches shall be ductile iron or polyvinyl chloride PVC as shown on the drawings and as herein specified.

B. Pipe for force mains larger than 48 inches shall be ductile iron. Pipe to be used as a casing in sizes 4 inches and larger shall be welded steel pipe as shown on the drawings and as herein specified.

C. Pipe to be installed underground shall be push-on joint type.

D. Pipe installed on bridges, piles or other above ground installations shall be restrained joint ductile iron pipe or flanged ductile iron pipe as described in these specifications.

E. PVC pipe shall not be used in above ground applications.

F. Underground pipe shall be furnished in nominal 18 or 20 foot laying lengths unless indicated otherwise on the drawings.

G. Pipe shall be cut to length as required to fit installation conditions.

H. Pipe sizes and applications shall conform to the following chart.

PIPE	PIPE SIZE	JOINT TYPE	APPLICATION
Ductile Iron	3 inches and larger	Mechanical joint, push-on joint, flanged joint, ball joint, etc.	force mains above ground or otherwise exposed
PVC DR18 & SDR21	1-1/2 inches thru 48 inches	Push-on joint	force mains
PVC SCH 80	4 inches and smaller	Solvent Weld	Septic system leach field and tankage only

I. DUCTILE IRON PIPE

1. Ductile iron pipe wall thickness and pressure class shall conform to ANSI Specification A21.50 (AWWA C150) and ANSI A21.51 (AWWA C151) with

pressure class 350 as a minimum.

2. Pipe shall also be certified by ISO 9000 by an accredited registrar.
3. Each length shall be clearly marked with the name of the manufacturer, location of the foundry, pressure rating, thickness or pressure class, nominal pipe diameter, weight of pipe without lining and length.
4. All pipe furnished by the manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data.
5. All ductile iron pipe shall be externally coated and internally lined as specified in this section.
6. All ductile iron pipe shall be color coded green by field painting a green stripe, 3 inches wide, along the crown of the pipe barrel.

J. POLYVINYL CHLORIDE PRESSURE PIPE

1. Pipe shall be virgin polyvinyl chloride (PVC) pipe rated for potable water and shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3139. Elastomeric seals shall meet ASTM F477. The pipe material shall be clean, virgin, National Sanitation Foundation No. 14 approved, Class 12454-A or 12454-B PVC compound conforming to ASTM resin specification D1784. Each length shall be clearly marked with the name of the manufacturer, location of the plant, pressure rating, nominal pipe diameter and length. Storage and handling of PVC pipe shall be in accordance with chapter 6 of AWWA Manual M23. All PVC force main piping shall be green.
2. PVC 1120, CLASS 150, DR 18 PIPE
   a. Pipe shall conform to AWWA Standard C900 for 4 inch through 12 inch pipe, and AWWA Standard C905 for 14 inch through 36 inch pipe.
   b. All pipe shall be hydrostatically proof tested at the factory in conformance with UNI-B-11 standards.
   c. In case of conflict between standards specified herein, the requirements of AWWA Standard C900 and C905 shall prevail.
   d. Pipe is to be manufactured to ductile iron pipe equivalent outside diameters.
   e. The pipe shall be designed to pass without failure a sustained pressure test of 500 psi in conformance with ASTM D1598 and a quick burst test of 755 psi in conformance with ASTM D1599.
3. PVC 1120, PR200, SDR21 PIPE
   a. Pipe shall conform to ASTM D2241 and shall be used where shown on the plans.
   b. Pipe is to be manufactured to I.P.S. (Steel) Standard Pipe equivalent outside diameters.
   c. The pipe shall be designed for a hydrostatic working pressure of 200 psi at 73.4 degrees F and to pass without failure a sustained pressure test of 420 psi minimum when tested in accordance with ASTM D1598, and a quick burst test of 630 psi minimum when tested in accordance with ASTM D1599.
4. PVC 1120, SCHEDULE 80 PIPE
   a. Pipe shall conform to ASTM D1784 and D1785 and shall be used only for the construction of reduced capacity pump station piping.
   b. Pipe is to be manufactured to I.P.S. (Steel) Standard Pipe equivalent outside diameters.

c. The sustained pressure test shall be conducted in accordance with ASTM D1598 at test pressures given in ASTM D1785.
d. The burst pressure test shall be conducted in accordance with ASTM D1599 at test pressures given in ASTM D1785.

2.02 FITTINGS

A. Fittings shall have joints that match the type of pipe furnished except as otherwise specified.

B. Fittings on 1-1/2 inch and 2-inch PVC pipe may be PVC with push-on bell type joint or solvent weld.

C. Fittings 3-inches and larger on push-on joint pipe for underground PVC and DIP mains shall be ductile iron class 350 through 12" and class 250 in sizes 16" and larger (short body type).

D. The fitting joints shall be restrained as necessary to prevent movement of pipe or appurtenances in response to thrust.

E. The restraints may be in the form of concrete thrust blocks (as shown in Detail No. III-12) or mechanical joint restraints (as specified in Section VIII, Sub-Section 2.3.8) depending on the design requirements.

F. The fittings shall be cement lined and sealed the same as ductile iron pipe in accordance with AWWA/ANSI C110 latest revision.

G. Long body fittings may be used where the drawings specifically call for them, where compact fittings are not available, or at the option of the Contractor when the laying length is not controlled by compact fitting patterns.

H. Fittings 3-inches and larger installed aboveground shall be ductile iron with flanged ends or restrained joints unless shown otherwise on the drawings.

I. DUCTILE IRON FITTINGS
1. Ductile iron fittings shall have a minimum working pressure of 250 psi.
2. Fittings shall conform to ANSI Specification A21.10 (AWWA C110), A21.11 (AWWA C111), A21.15 (AWWA C115) and/or A21.53 (AWWA C153).
3. Fittings shall also be certified by ISO 9000 by an accredited registrar.
4. Compact fittings sized 3 inches through 16 inches shall normally be installed.
5. Long body fittings shall also be used where the drawings specifically call for long body fittings, where compact fittings are not available, or at the option of the Contractor when the laying length is not controlled by compact fitting patterns.
6. All fittings shall be UL/FM approved and shall conform to NSF Standard 61 as applicable.
7. All fittings furnished by the approved manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data.

8. Fittings shall have cast on them the pressure rating, nominal diameter of openings, manufacturer's name, foundry location, plant code and degrees or fraction of the circle.
9. Cast letters and figures shall be on the outside body of the fitting.
10. All ductile iron pipe shall be externally coated and internally lined as specified in this section.
11. POLYVINYL CHLORIDE FITTINGS
    a. The fittings shall conform to the appropriate sections of these specifications for PVC Pipe and PVC Pipe Joints.
    b. PVC 1120, Class 150, DR18 fittings:
        i. PVC fittings 4 inches thru 8 inches may be used with PVC C900 pipe.
        ii. Fittings shall be PVC injection molded, made from materials meeting or exceeding the requirements of cell class 12454-B material as defined in ASTM D1784.
        iii. All PVC fittings must comply with, or exceed, AWWA C907.
        iv. All fittings must be designed to the pressure class of DR18, with a pressure rating of 150 psi and a 2.5 to 1 factor of safety.
        v. Virgin materials only shall be used in the manufacture of PVC pressure fittings.
        vi. These fittings must have UL-FM approval and shall comply with or exceed all ASTM Standards for PVC fittings.
        vii. All fittings must have NSF-61 approval.
        viii. The elastometric gasket shall comply with the requirements specified in ASTM F477.
    c. PVC 1120, SDR21, Fittings:
        i. SDR21 fittings shall be injection molded, push on bell type with elastomeric rubber seals in accordance with ASTM D3139.
        ii. Seals shall conform to ASTM F477.
    d. PVC 1120, schedule 80 FITTINGS
        i. Schedule 80 PVC fittings shall be solvent weld joints and shall be in accordance with ASTM D2672.
12. NONSTANDARD FITTINGS AND WALL CASTINGS
    a. Fittings having nonstandard dimensions and cast specifically for this project shall be of approved design.
    b. They shall be manufactured to meet the requirements of the same specifications and shall have the same diameter and thickness as standard fittings, but their laying lengths and types of ends shall be determined by their positions in the pipelines and by the particular piping to which they connect.
    c. Wall castings shall be of the size and types indicated on the drawings.
    d. Flanges, facing, and drilling shall conform to the 125-pound American National Standard.
    e. Flanges shall be drilled and tapped for studs. Other dimensions shall be substantially equal to corresponding parts of standard bell and spigot fittings

2.03 JOINTS

A. Type of joint used shall be approved by the Engineer prior to installation.

B. Joints shall be made in accordance with approved printed instructions of the manufacturer, and shall be absolutely watertight.

C. MECHANICAL JOINTS
1. All jointing materials for mechanical joints shall be provided by the pipe and/or fitting manufacturer.
2. Material assembly and bolting shall be in accordance with ANSI Specification A21.11 (AWWA C111).
3. All glands shall be made of ductile iron only.
4. Mechanical joint gaskets shall be of a composition suitable for exposure to sewage, sludge or scum within the pipe.

D. PUSH-ON JOINTS
1. DUCTILE IRON
   a. Push-on joints shall be in accordance with ANSI Specification A21.11 (AWWA C111).
   b. All joint material shall be provided by the pipe manufacturer and installation shall be in accordance with the manufacturer's recommended practice.
2. POLYVINYL CHLORIDE (PVC)
   a. PVC pipe joints shall be the manufacturer's standard push-on bell type with rubber sealing ring in accordance with ASTM D3139.
   b. Elastomeric gaskets shall conform to ASTM F477.

E. FLANGED JOINTS
1. Ductile iron flanged joints shall conform to ANSI A21.10 (AWWA C110) and ANSI A21.15 (AWWA C115).
2. Flanges shall be in accordance with ANSI Specification B16.1, Class 125 with any special drilling and tapping as required to insure correct alignment and bolting.
3. Screwed flanges shall be screwed in tight at the foundry by machine before they are faced and drilled.
4. Flanges for flanged joints and flanged specials shall be integrally cast at right angles to the axis, accurately faced, and drilled smooth and true.
5. Gaskets shall be rubber ring type, cloth inserted, and minimum thickness of 1/16 inch and shall be used on all flanges.
6. The entire gasket, including the retainer and sealing ring, shall be one continuous piece.
7. Retainers glued together will not be accepted.
8. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped.
9. The number and size of bolts shall conform to the same ANSI standard as the flanges.

10. Bolts and nuts shall be of Grade B conforming to the ASTM Specifications for steel machine bolts and nuts and tap bolts, designation A307.
11. Bolt studs shall be of the same quality as machine bolts.
12. Bolts shall be tightened so as to distribute evenly the stress in the bolts and bring the pipe in alignment.
13. The Contractor shall provide suitable filling rings where the layout of the flange piping is such as to necessitate their use.
14. In materials, workmanship, facing and drilling, such rings shall conform to ANSI B16.1 Class 125.

F. MACHINED SURFACES

1. Machined surfaces shall be cleaned and coated with a suitable rust preventive coating at the shop immediately after being machined.

G. POLYVINYL CHLORIDE SOLVENT WELD JOINTS

1. Pipe joints for schedule 80 pipe, 3 inches only, shall be solvent weld joints.
2. The solvent cement shall comply with ASTM D2564.
3. The joint shall be made in accordance with ASTM D2855.
4. The joint shall conform to ASTM D2672.

H. RESTRAINED JOINTS

1. RESTRAINERS
   a. The restrainer shall be manufactured of ductile iron and shall meet or exceed all the requirements of ANSI A21.11 (AWWA C111) and ASTM A536.
   b. The restrainer system shall provide anchoring of PVC pipe to mechanical joint fittings or bell to spigot PVC pipe joints. Restraints shall provide a full 360 degree contact with sufficient gripping action to secure the clamp to the pipe and be designed so that restraint action is increased as a result of increases in line pressure.
   c. The restrainer shall accommodate the full working pressure rating of the pipe plus surge allowance.
2. RETAINER GLANDS
   a. Retainer glands shall be manufactured of ductile iron grade 64-42-10, ASTM A536 or pre-approved equal and shall be designed to fit standard mechanical joint bells conforming to applicable sections of ANSI A21.10 (AWWA C110), ANSI A21.11 (AWWA C111) and ANSI A21.53 (AWWA C153).
   b. The restraining device shall be rated for the full working pressure of the pipe including surge allowance and a 2:1 safety factor.
   c. Mechanical restraints shall include a restraining mechanism which, when actuated, imparts a wedging action against the pipe, increasing its resistance as the pressure increases.
   d. The restraint shall be compatible with the type of joint being installed.
   e. The joint deflection shall not exceed 80% of the pipe manufacturer's recommended maximum deflection. Deflection, if necessary, shall be made before tightening the setscrews.
   f. Bolts and setscrews shall be tightened alternately, 180 degrees apart, to the

torque recommended by the manufacturer.

g. Retainer glands having set screws that make point contact with the pipe without using a pad to disperse point loading shall not be used on PVC pipe.

h. The restraining device shall not damage or lower the working pressure of the pipe installed.

I. FLANGE ADAPTERS

1. Flange adapters shall be ductile iron, manufactured to ASTM A536 standards.
2. Bolt circles and boltholes shall meet ANSI B16.1 for 125 pounds. Adapter flanges shall meet or exceed all test requirements of AWWA C900, ASTM D2241 and ASTM D1599.

J. PIPE COUPLINGS

1. The Contractor shall furnish and install pipe couplings as required to complete the work.
2. Pipe couplings used to join two pieces of ductile iron pipe or PVC pipe shall be sized to match the outside diameter of the pipeline.
3. Transition couplings shall be used to join pipes of different outside diameters.
4. The coupling sleeve shall be manufactured of ductile iron conforming to ASTM A536 and be coated with 14 mils of epoxy.
5. The bolts shall be manufactured of a metal of high corrosion resistance and shall conform to ANSI 21.11 (AWWA C111).
6. Gaskets shall be wedge-type and manufactured of virgin SBR for water and sewer services
7. The installation of all couplings shall be in accordance with manufacturer's recommendations.
8. After installation, all coupling surfaces including bolts and nuts shall be coated with an approved coating as specified in this section of these specifications.

K. FULL CIRCLE REPAIR CLAMPS

1. Full circle repair clamps shall have type 304 stainless steel shell, lugs, bolts, nuts and washers as per ASTM A193, A194, A240, or shall have type 304 stainless steel shell per ASTM A240, ductile iron lugs as per ASTM A536, and 304 stainless steel bolts, washers and nuts.
2. Gaskets for both types shall be virgin SBR as per ASTM D2000 for water and sewer service.

2.04 CORROSION PROTECTION FOR DUCTILE IRON PIPE

A. SPECIFICATION FOR PROTECTO 401 CERAMIC EPOXY LINING OF DUCTILE IRON WASTEWATER FORCE MAIN PIPE

1. Lining – Clean and abrasive blast the surfaces of the pipe and fittings to be lined. The lining is to be applied at a nominal 40 mils dry film thickness. The bell and sockets and spigot ends are to be coated (after the application of the lining) up to 6 inches back from the ends with 6 mils nominal, 10 mils maximum with Protecto Joint Compound. All work to be performed in accordance with manufacturer's specifications.

2. Touch-Up and Repair – Protecto Joint Compound shall be used to touch-up or repair in accordance with manufacturer recommendations. Do not apply Protecto 401 over Protecto Joint Compound.
3. Inspection and Certification – Inspect and certify lining thickness and material in accordance with manufacturer specifications.
4. Handling – Protecto 401 lined pipe and fittings must be handled only from the outside of the pipe and fittings. No forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or laying.

B. EXTERIOR COATING

1. All ductile iron pipe and fittings, except on bridges or as otherwise noted, shall receive an exterior bituminous coating as specified in ANSI A21.51.
2. The finished coating shall be continuous smooth, neither brittle when cold nor sticky when exposed to the sun, and adhere strongly to the fitting.
3. All bolts, nuts, studs and other uncoated parts of joints for underground installation shall be coated with asphalt or coal-tar prior to backfilling.
4. Pipes crossing under ditches, culverts, rivers, creeks, etc., shall be considered as buried pipe.
5. All ductile iron pipe shall be color coded green by field painting a green stripe, 3 inches wide, along the crown of the pipe barrel.

C. POLYETHYLENE WRAP

1. In areas where soils are corrosive in nature, ductile iron pipe, fittings, valves and other appurtenances shall be protected with polyethylene wrap or tubing.
2. The Contractor shall furnish and install polyethylene tube or wrap for ductile iron pipe at the locations shown on the construction drawings.
3. Material
   a. The polyethylene material shall meet or exceed the requirements of AWWA C105 in all respects.
   b. The wrap shall be virgin, high density polyethylene, 4 mils thick minimum. The polyethylene wrap shall be white.
4. Installation
   a. Although not intended to be a watertight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill.
   b. Installation shall be done according to one of the methods described in Section 5.4 of AWWA C105, subject to approval by the Engineer and the manufacturer.

2.05 PIPING SUPPORTS

A. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the drawings or as specified.

B. Piping within pumping stations shall be adequately supported from floors, walls, ceilings or beams. Supports from the floor shall be suitable concrete piers as indicated or approved. Concrete piers shall conform accurately to the bottom one-third to one-half of the pipe. Piping along walls shall be supported by approved stainless steel wall

brackets. Supports shall be located wherever necessary, and in no case shall they exceed 8 feet on centers for ductile iron pipe and 4 feet on centers for PVC pipe.

2.06 LOCATE WIRING

A. Locate wiring shall be 10 gauge, single strand, UF-rated (direct burial), copper wire.

B. Plastic ties for connecting to sewer mains shall be plastic, zipper type ties.

C. Ground clamps shall be bronze-serrated head with brass-bronze screws.

D. Wire connectors shall be PinPoint wire connectors by Duraline or pre-approved equal.

2.08 MATERIAL TESTING

A. The UD may perform random testing of materials furnished for conformance to the following standards.

B. The entire product of any manufacturer or of any one plant may be rejected when the methods of manufacture fail to secure uniform results acceptable to the requirements of these specifications.

C. Pipe and materials shall be tested for conformity with, the latest editions of the following:

Item	Specifications
Ductile Iron Pipe and Fittings	ANSI A21.50 (AWWA C150) ANSI A21.51 (AWWA C151) ANSI A21.53 (AWWA C153)
Polyvinyl Chloride Pipe and Fittings	ASTMD1598 ASTMD1599 ASTMD2672 ASTMD2837 ASTMD2855 ASTMD2837 ASTMD3139 ASTMF477 AWWAC900 AWWAC905 AWWA C907

PART 3 - EXECUTION

3.01 REFERENCE POINTS AND LAYOUT

A. The Contractor shall be responsible for setting all grade stakes, lines and levels.

B The Contractor or Contractor's Surveyor will provide centerline of construction and will establish a benchmark.

C. Any reference points, points of intersection, property corners, or bench marks, which are disturbed during construction shall be restored by a Land Surveyor registered to practice in the State of Florida, and all costs thereof shall be borne by the Contractor.

D. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes.

3.02 HANDLING AND CUTTING PIPE

A. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating.

B. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

C. In any pipe showing a distinct crack in which it is believed there is no incipient fracture beyond the limits of the visible crack may be cut off before the pipe is laid so that the pipe used shall be perfectly sound.

D. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack.

E. Except as otherwise approved, all cutting shall be done with a power driven cut off saw. All cut ends shall be examined for possible cracks caused by cutting.

3.03 PIPE INSTALLATION

A. GENERAL REQUIREMENTS

1. Force mains shall be constructed of the materials specified and as shown on the drawings.
2. Pipe and fittings shall be carefully handled to avoid damage, and if feasible, while they are suspended over the trench before lowering, they shall be inspected for defects and to detect cracks.
3. Defective, damaged or unsound pipe or fittings shall be rejected.
4. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints.
5. Any pipe that has its grade or joint disturbed after laying shall be taken up and re-laid.
6. All precautions shall be taken to prevent sand or other foreign material from entering the pipe during installation.
7. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe.
8. Any time the pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the Engineer.

9. Plugs shall remain in pipe ends until all water is removed from the trench.
10. Any sand or foreign material that enters the pipe shall be removed from the pipe immediately.
11. No pipe shall be installed when trench conditions (standing water, excess mud, etc.) or the weather (rain, etc.) is unsuitable for such work, except by permission of the Engineer.
12. Any section of pipe already laid which is found to be defective or damaged shall be replaced with new pipe.

B. PIPE COVER

1. The cover over all piping shall be a minimum of 30 inches in unpaved areas and 36 inches in paved areas with a maximum of 60 inches unless specifically approved otherwise.
2. Cover for pipe under pavement shall be measured from finished grade.
3. Any reduction in pipe cover will require approval from the Engineer.
4. Greater depths will be permitted where required to miss obstructions only.
5. Lines shall be located as shown on the drawings.
6. Lines shall be laid to a grade that will permit entrapped air to flow to a high point for release through air release valves as located on the drawings.
7. The Contractor shall investigate well in advance of pipe laying any conflicts which may require readjustments in planned locations and advise the Engineer of the results of these investigations so that the Engineer may give instructions as to the modifications required.
8. Refer to Specification 02320 for backfill and compaction requirements.

C. INSTALLATION OF IRON PIPING

1. All iron pipe and fittings shall be laid in accordance with the pipe manufacturer's recommendations and the American Water Works Association Specification AWWA C600.

D. THRUST RESTRAINT

1. All non-flanged fittings and valves shall be restrained using one of the following methods:
2. Mechanical restraint at fittings and valves and mechanical restraint along adjacent joints of pipe to a length as specified in the following table.
3. Mechanical joint at fittings and valves shall be restrained using an approved restraining device and tie rods along adjacent joints of pipe to a length as specified in the following chart. All pipe sizes 3 inch to 8 inch in diameter shall have a minimum of 2 tie rods per joint, pipe sizes 10 inch to 12 inch in diameter shall have a minimum of 4 tie rods per joint, and pipe sizes 14 inch to 20 inch in diameter shall have 6 tie rods per joint. To connect tie rods to fitting, offset eyebolts shall be used. Tie rods shall be 3/4 inch diameter, steel, threaded as required, installed with a washer and nut on either side of the joint and shall be coated with a minimum of 5 mils (dry thickness) asphalt or coal-tar prior to backfilling.
4. 1-1/2 inch and 2-inch force mains shall be restrained using mechanical joint restraints at valves and fittings and 8-inch by 16-inch concrete block thrust blocks. A neoprene pad shall be placed between the concrete block and the fitting.

PVC PIPE
CHART FOR MECHANICAL RESTRAINT LENGTHS

MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)									
NOMINAL PIPE SIZE (INCHES)	11 1/4° Horizontal Elbow	22 1/2° Horizontal Elbow	45° Horizontal Elbow	90° Horizontal Elbow	Horizontal Tees	Horizontal Plugs and Valves	45° Vertical Offset Upper length/lower length	22½° Vertical Offset Upper length/lower length	Reducer (to 1 size smaller) Length on Larger Size Side
4	2	4	7	18	20 - run 1 – branch	39	16 / 3	8 / 1	n/a
6	2	5	10	25	20 - run 1 – branch	55	23 / 4	11 / 2	28
8	3	6	13	32	20 - run 1 – branch	72	30 / 5	14 / 3	30
10	4	8	16	38	20 - run 1 – branch	86	36 / 6	17 / 3	29
12	4	9	19	45	20 - run 1 – branch	102	42 / 8	20 / 4	50
14	5	10	21	51	20 - run 10 – branch	116	48 / 9	23 / 4	30
16	6	11	23	57	20 - run 26 – branch	131	54 / 10	26 / 5	30
18	6	12	26	62	20 - run 41 – branch	145	60 / 11	29 / 5	29
20	7	13	28	68	20 - run 55 – branch	158	66 / 12	36 / 6	29
24	8	16	32	78	20 - run 58 – branch	185	77 / 11	37 / 7	55
30	9	18	38	92	20 - run 77 – branch	221	92 / 17	44 / 8	77
36	10	21	44	105	20 - run 115 – branch	256	106 / 20	51 / 10	77

NOTE Table assumptions PVC pipe, Safety Factor = 1 5, Soil = GM or SM, 3 ft bury depth to top of pipe, trench type 3, branch on tee is one size smaller than run of tee size and 20 feet of pipe is installed past the tee on the run side (smaller branch sizes must be calculated by the engineer) Vertical offsets are 3 feet deep on top and 8 feet deep on bottom Reducers are calculated for one size reduction. Test pressure of 150 psi

The use of thrust blocks shall be limited to situations such as point repair where exposing several joints of pipe is not feasible due to existing ground conditions Thrust blocks also must be used with mechanical joint restraining devices when, in the judgment of the Engineer, the nature and criticality of an installation is such as to require positive assurance of stability

Concrete collars with tie rods may be used on dead end lines at the Contractor's discretion. Concrete used for this purpose shall be 2,500 psi minimum. When applicable, schedule and details for the required thrust blocks are included on the drawings The Citrus County Standard Details show minimum sized thrust blocks for use in good soil Poor soils will require larger thrust blocks

3.04 FORCE MAIN AND WATER MAIN SEPARATION REQUIREMENTS

A. REQUIREMENTS

1. Horizontal Separation between Parallel Lines:
   a. All new and relocated wastewater force mains shall be located at least six feet (preferably ten feet) horizontally from water mains.
   b. The horizontal distance between a potable water main and an onsite sewage treatment and disposal system shall be ten feet minimum.
   c. All distances are measured from outside pipe edge to outside pipe edge.
2. Vertical Separation between Crossing Lines:
   a. Any new or relocated wastewater force mains shall cross above or below (preferred) the water mains with a minimum vertical distance of 12 inches between the outside of the wastewater force main and the outside of the water mains. Such crossings shall be arranged so that all pipe joints are equidistant from the point of crossing with no less than ten feet between any two joints (or alternatively, the mains at such crossings shall be placed in sleeves to obtain the equivalent of the ten-foot separation between joints).

3.05 SYSTEM CONNECTIONS

A. All connections and ties to the Citrus County Sewer System will be performed by the Contractor under the supervision of Citrus County's representative.

3.08 FIELD TESTING

A. LEAKAGE AND PRESSURE TESTS

1. The Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by Citrus County or connecting pipeline to any existing pipeline or facility. All field tests shall be made in the presence of the Engineer.
2. Except as otherwise directed, all pipelines shall be tested.
3. Pipelines laid in excavation (other than trench excavation) shall be tested prior to the backfilling of the excavation.
4. All piping to operate under liquid pressure shall be tested in sections of approved length.
5. For these tests, the Contractor shall furnish clean water, suitable temporary testing plugs or caps, other necessary equipment, and all labor required.
6. If the Contractor chooses to pressure test against an existing Citrus County valve, Citrus County will not be responsible for failure of the pressure test due to the existing valve leaking.
7. If positive test results cannot be obtained because the Citrus County valves will not hold the test pressures, the Contractor shall be required to disconnect from the Citrus County System and re-test independent of the Citrus system at the Contractor's expense.
8. The Contractor will furnish suitable pressure gauges, calibrated by an approved testing laboratory, with increments no greater than 2 psi.
9. Gauges used shall be of such size that pressures tested will not register less than

10% nor more than 90% of the gauge capacity.

10. Leakage and pressure testing shall be in accordance with AWWA C600 and as outlined below.
    a. Prior to pressure and leakage tests, all piping shall be thoroughly cleaned of all dirt, dust, oil, grease and other foreign matter. This work shall be done with care to avoid damage to any inside coating. All lines shall be thoroughly flushed with clean water to clear all lines of foreign matter. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. If blow-offs or other outlets are not available at high points for releasing air, the Contractor shall make the necessary taps at such points and shall plug said holes as directed after completion of the test.
    b. Hydrostatic testing shall consist of a combined pressure test and leakage test. Specified test pressures, based on the elevation of the highest point of the line or section under test, and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connection and all necessary apparatus, shall be furnished by the Contractor and shall be subject to the approval of the Engineer. All valves shall be hydrostatically tested to insure sealing (leak allowance) of all line valves. See Sub-Section 430.
    c. All piping shall be pressure and leakage tested for a minimum of two hours duration at 150 psi. Pressure tests shall be conducted with a pressure loss of not more than 5 psi regardless of length being tested. No pipe will be accepted if pressure loss is greater than 5 psi regardless of leakage test results. All exposed pipe, fittings, valves and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory. Repairing, replacing, and retesting shall be done at the Contractor's expense.
    d. Leakage tests shall be conducted simultaneously with the pressure tests. At the end of the pressure test, the line will be pumped back to initial test pressure. The quantity of water used to repump the line shall be measured and compared to the limitations calculated using the leakage equations and chart noted below. No pipe installation will be accepted if the leakage is greater than determined by the formulas or the chart noted below:

For DIP Pipe	For PVC Pipe
$L = (SDP^{1/2})/13320$	$L = (NDP^{1/2})/7400$
Where	
L = Leakage, GPH (allowable leakage)	L = Leakage, GPH
	L = Leakage, GPH
S = Length of pipe run, FT	N = No. of joints
D = Dia., Inches	D = Dia., Inches

P = Test Pressure, PSI P = Pressure, PSI

See chart for HDPE pipe in Section VII, Sub-Section 3.6.5.4.

If any test discloses leakage greater than that specified above, the Contractor shall, at its own expense, locate and repair the defective material and retest until the leakage is within the specified allowance.

e. In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are complied with. All testing shall be performed at the Contractor's expense. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made with approval; but, in any event, the Contractor shall be responsible for the ultimate tightness of the piping within the above requirement.

B. LOCATE WIRING TESTING

1. Installed locate wiring shall be tested by the contractor with an approved testing company using approved equipment.
2. Locate wire testing company must be provided a copy of the As-Builts.

3.09 INSPECTION

A. All pipe and fittings shall be subject to inspection at time of delivery and also in the field just prior to installation.

B. All pipe and fittings, which in the opinion of the Engineer do not conform to these specifications, will be rejected and shall be removed by the Contractor.

C. An authorized Citrus County Representative must be present for all pressure and leakage testing and connections to Citrus County's existing lines.

3.10 LOCATE WIRING

A. Contractor shall furnish and install locate wiring on all PVC force mains installed. Installation shall conform to Citrus County Standard Details.

B. Locate wire must be attached to force mains with plastic zipper type electrical ties at each side of bell joint or fitting and at 10 foot intervals along pipeline.

C. Locate wire shall be brought to within 8 inches of grade outside a valve box as required, at 475 foot intervals.

D. Locate wire shall be installed on top of the pipe.

E. Locate wire shall be attached to intersecting PVC pipelines using a three way splice and brass split ground clamp with wire installed around brass nipple.

F. Locate wiring must have the ability to conduct an electrical current, therefore the wiring must be continuous with any breaks in the line spliced.

G. Locate wire shall be spliced with approved wire connectors.

END OF SECTION

SECTION 02450
GRAVITY LEACHATE SEWER COLLECTION SYSTEM & FORCE MAIN

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work included under this section consists of furnishing all necessary labor, equipment, materials, and performing all operations in connection with construction of leachate gravity collection sewers, appurtenant structures, and leachate system force main, including excavation, trenching, backfilling and appurtenant work as required or as directed.

B. Installation locations: all on-site yard piping gravity leachate lines, leachate collection piping internal to buildings and leachate force main to existing leachate pump station wetwell.

1.02 SUBMITTALS

A. Shop drawings shall be submitted in accordance with Specification ~~01300~~01340 for all materials associated with construction of the leachate collection system.

B. Furnish in duplicate to the Engineer certificates that all tests and inspections required by the Specifications under which the pipe is manufactured have been satisfied.

C. Provide a certified statement from the HDPE pipe supplier that those personnel responsible for fusing the pipe have been trained and certified.

1.03 REFERENCE DOCUMENTS

A. AWWA C906, Standard for Polyethylene (PE) pressure pipe and fittings, 4-inch through 63-inch for water distribution and transmission.

B. ASTM D1248-84, Polyethylene Plastics Molding and Extrusion Materials.

C. ASTM D-2321, Underground Installation of Flexible Thermoplastic Sewer Pipe.

D. ASTM D3350-84, Polyethylene Plastic Pipe and Fittings Material.

E. ASTM F714-85, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

PART 2 – MATERIALS AND EQUIPMENT

2.01 HIGH DENSITY POLYETHYLENE PIPE

A. HDPE Pipe and Fittings Specifications:

1. High Density Polyethylene pipe 4" diameter and larger shall conform to material standard ASTM D3350 345464 C cell classification rated as PE 3408 by the Plastics Pipe Institute. Pipe shall be in conformance with AWWA C906. Minimum pressure rating shall be 160 psi SDR 11 (Standard Dimension Ratio) for pipe sizes 4" in diameter and larger. All pressure ratings are at standard test conditions and temperature of 73.4°F (23°C).
2. The polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black well dispersed by precompounding in a concentration of not less than 2 percent. Pipe shall be color coded green to indicate wastewater service.
3. The pipe manufacturer shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements of the resin manufacturer for the resin used to manufacture the pipe in this project.
4. Chemical resistance data from the pipe manufacturer on the application will be provided and a certification letter from the manufacturer shall be required as part of the submittal.
5. All HDPE pipe 4" and greater shall have a Ductile Iron Pipe Sizing (DIPS) outside diameter unless otherwise specified in the Contract Documents.
6. All HDPE piping system components shall be the products of one manufacturer.

B. HDPE Pipe Jointing Method:

1. HDPE pipe shall be jointed by the butt-fusion process in accordance with pipe manufacturer's directions. Contractor shall provide butt-fusion technicians who are trained and certified by the HDPE pipe manufacturer to complete the project. The date of technician certification shall not exceed 12 months before commencing construction.
2. All HDPE pipe joined by butt-fusion shall be made from the same class and type of raw material made by the same raw material supplier.
3. Butt-fusion means the butt-joining of the pipe by softening the aligned faces of the pipe ends in a suitable apparatus and pressing them together under controlled pressure.
4. The internal and external beads resulting from the butt-fusion process shall be visible and examined for penetration 360 degrees around the pipe diameter.

2.02 PRE-CAST MANHOLES

A. Manholes shall consist of a base with monolithically cast bottom barrel section, vertical pipe barrel sections, concentric top section, adjustment section or grade ring(s), and a frame and cover.

B. Manhole base, sections, and top shall conform to the requirements of ASTM C 478, "Specification for Precast Reinforced Concrete Manhole Sections", with the exception

of Section 10 (a), except as modified herein. Cement shall meet the requirements of ASTM C 150, Specification for Portland Cement, Type II. Minimum wall thickness shall be five (5) inches. Riser shall be custom-made with openings to meet indicated pipe alignment conditions and invert elevations.

C. The base of the manhole shall be cast integrally with the bottom manhole section. The base section shall be set in the leveling course of crushed stone subbase compacted to not less than 98% of maximum dry density as determined by the Modified Proctor Test ASTM D-1557 and as shown on Construction Drawings.

D. Manholes shall have a 48-inch inside diameter.

E. Section joints shall be a tongue and groove with "ram-neck" gasket or "O" ring to provide a watertight joint. An alternate joint contact seal may be used when the joint surface is manufactured with the tongue equipped with a proper recess for the installation of an "O"-ring rubber gasket, conforming to ASTM C443, "Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gasket." Alternate joint gasket material shall be equivalent to D-LOK JOINT GASKET, manufactured by Atlantic Concrete products, Inc.

F. The interior of all precast manholes, including the base slab, shall be lined with an integrally cast HDPE membrane liner manufactured by GSE, AGRU-AMERICA or approved equal and shall be installed by a manufacturer- approved installer. The liner shall be free of pores, pinholes, voids, and foreign bodies. The lining system shall be designed to be repairable any time during the life of the system. Interior HDPE liners shall be installed during precasting operations in accordance with the manufacturer's specifications. All liners shall be installed by a manufacturer certified contractor.

G. Connection to manholes shall be made with a flexible neoprene rubber or HDPE boot. All locations where pipes enter or leave the wet well shall be made watertight with wall sleeve and seal.

H. A concrete bench shall be formed in the bottom of the manhole as shown on the drawing details. Changes in direction within the manhole shall be laid out in smooth curves of the longest possible radius that is tangent to the centerlines of adjoining pipeline. The concrete bench shall be coated with Tnemec Series 435 Perma-Glaze, 30-40 mils thick in one or two coats.

I. All manhole parts shall be numbered or lettered before being sent to job site to permit proper construction placement. A plan or list of the numbering system shall be present on the job site when manhole components are delivered.

2.03 COATINGS

A. The exterior of all leachate manholes shall be coated with an approved epoxy from Citrus County minimum standard and construction specifications for water and wastewater systems.

2.04 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers, for structures and for manholes, shall be heavy duty cast iron frames and covers designed for traffic loads.

B. Frames for manholes shall be pressure-tight base flange type.

C. Frame and cover shall be United States Foundry Drawing No. 170-E-ORS - Type E cover with O-ring seal built into manhole or approved equal. O-ring shall be neoprene or other approved synthetic rubber material. Cover and frame castings shall meet the requirements of ASTM A 48, Specifications for Gray Iron Castings, Class No. 35, or Grade 65-45-12 Ductile Iron meeting the requirements of ASTM A 536, "Standard Specification for Ductile Iron Castings". In either case, manhole frame and cover shall be designed to withstand an HS20-44 loading defined in the AASHTO Specifications.

D. Before delivery to the construction site, manhole frame castings and manhole covers shall be coated with POR-15 EPOXY COATING, manufactured by Choice Products, Inc. Frames and covers shall be machined or ground at touching surfaces so as to seat firmly and prevent rocking prior to O-ring installation. Any set not matching perfectly shall be removed and replaced.

E. "Leachate" shall be embossed in cover.

F. Install cast iron frame and cover for each manhole and adjust the frame and cover to proper grade. Frame and cover shall be neatly grouted with non-shrink grout.

G. All castings shall be set flush in paved areas and flush with finished grade in unpaved areas unless shown otherwise on plans.

H. Setting Manhole Frames - Manhole frames and covers shall be set to conform accurately to the finished ground or pavement surface as established by the Construction Drawings, unless otherwise directed by the Engineer. Frames on manhole cones shall be set concentric with the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flanges of the frame shall be completely filled and made watertight. A ring of mortar at least one inch thick and pitched to shed water away from the frame shall be placed around the outside of the bottom flange. Mortar shall extend up to the outer edge of the masonry and shall be finished smooth and flush with the top of the flange.

I. The adjustment section shall be a minimum of 3 inches and shall not exceed 18 inches in height. The adjustment section for new construction shall not exceed 12 inches in height for conical top sections and 6-inches in height for flat tops. Adjusting rings for adjusting existing manhole covers to new grade shall be heavy duty cast iron manhole adjusting rings for 2-inch or greater adjustment and for 1-

inch adjustment shall be steel adjusting rings Type A, U.S. Foundry or approved equal. HDPE adjusting rings may also be used, as approved in Appendix B.

2.05 MORTAR FOR PIPE AND MANHOLE RISER

A. Mortar for pipe, manhole adjustment rings and brick joints, shall consist of one part Portland Cement Type II and two (2) parts by volume of mortar sand conforming to ASTM C 144. Mortar shall be used within one (1) hour of water addition. Lime shall not be used.

PART 3 - EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation, preparation of pipe bedding, and backfill for sewers, sewer connections, manholes, and other appurtenances shall be performed in accordance with the requirements of Section 02315 - "Excavation."

3.02 LAYING GRAVITY SEWERS

A. Each pipe shall be laid true to line and grade so as to form a close concentric joint with the adjoining pipe, preventing offsets in the flow line. All wye units, stubs, or other fittings placed in lines shall have the open bell tightly plugged using pipe manufacturers recommended watertight plug. All plugs shall be capable of withstanding 4-psi internal air test pressure, yet permit easy removal for future use. The open ends of all pipelines shall be kept securely stopped at the end of each day's work and at any other time when any operation is being carried out which might permit foreign materials, rock, dirt, etc. to enter the pipe. Pipelines shall be thoroughly flushed out upon their completion and when directed by the Owner's Engineer.

3.03 INSTALLATION REQUIREMENTS

A. HDPE Pipe. Installation of HDPE gravity leachate drain pipe shall be in accordance with the recommended practices contained in ASTM D-2321 and Specification 02315. Trench boxes and moveable sheeting shall be constructed and used in the trench to avoid disturbing the piping, bedding, and haunching when being moved forward in the trench.

3.04 JOINING PIPE TO MANHOLES OR OTHER STRUCTURES

A. Structure Connection: Approved standard groutable HDPE-to-manhole fitting or a flexible rubber boot shall be used at the manhole connection. The boot shall be manufactured of neoprene or isoprene compounds formulated and tested to resist deterioration due to sewage, hydrogen sulfide, fats, greases, petroleum products and byproducts. The connection at the manhole wall shall be flexible and watertight. Any annular space inside the manhole at the connection shall be filled with approved

caulking material or joint filter.

B. For manholes greater than or equal to 20 feet deep, all sewer connections to precast manholes shall be grouted on the interior and on the exterior in addition to the use of the rubber boot. The interior and exterior of connections to fiberglass manholes greater than or equal to 20 feet deep shall be glassed in.

3.05 INSPECTIONS OF LINES AND MANHOLES

A. Upon completion, the Contractor shall televise the gravity sewer system for inspection purposes and acceptance. Inspection of the completed lines and manholes shall be scheduled within a reasonable time after construction or when required by the Engineer.

B. Before scheduling an inspection, the Contractor shall prepare the lines by clearing and flushing. Manholes shall be clean, finished, and free of leaks.

C. Manholes shall be on a true and uniform grade. The inverts shall have a smooth steel troweled finish. All benches shall be uniformly sloping. The frames shall be tight and properly set in mortar on solid masonry. The invert, benches and adjacent pipe shall be free of splattered mortar. All required interior lining or paint shall be kept intact. Manhole frames shall be adjusted to grade with the covers and frames cleaned and free of mortar and asphaltic mixtures. All precast manhole seams shall be filled with an approved asphaltic compound.

D. Pipe between the manholes shall be true to line and grade. Any infiltration and dips and sags with 1/4" or more of trapped water shall be cause for rejection.

E. All television inspections shall be completed and approved by the County prior to the placing of any asphalt.

F. Faulty sections of sewer lines or manholes rejected by the Engineer shall be removed and re-laid by the Contractor. Sunken manholes will not be accepted.

3.06 PRECAST MANHOLES

A. Installation: All slabs or bottom sections shall be installed at a grade that will allow clearance under the belts of the pipe. All slabs or bottom sections shall be solidly installed on 3/4-inch bedding stone, which has been compacted against firm undisturbed ditch bottom. Depth of bedding stone will be as directed by the Engineer.

B. The tongue and groove ends of each unit shall be primed with Ram-nek primer and allowed to dry. Immediately before placing the next unit, the joints shall receive a coating of Ram-nek. Enough plastic material shall be placed in the joint to squeeze a bead of excess material out of the joint ensuring a completely sealed joint.

C. The top of the cone shall be set between 2 1/2 inches and 14 1/2 inches below the bottom of the manhole cover frame. It is the intent of the Specifications to provide a minimum of 2 1/2 inches to accommodate future grade changes without disturbing the manhole. Where the distance between the bottom of the manhole cover frame and the top of the cone is greater than 14 1/2 inches, 12 inch riser units shall be used to bring the top of the cone to within the limits specified.

D. On sewers 20' and deeper, the interior and exterior annular space between the sewer pipe and the opening in the manhole shall be grouted with Portland cement mortar and wiped or collared to ensure a watertight joint. Invert channels shall be formed after the manhole is set by one of the following methods: Build up with brick and mortar, or lay a full section of sewer pipe through manhole and cut out the top half. The manhole floor outside of the channels shall be made smooth and sloped toward the channels on a slope of 2 inches per foot.

3.07 MANHOLE RISER SECTIONS

A. Sewer manhole risers shall be watertight.

B. Construct cone section of manhole as detailed on the Construction Drawings. Make watertight connection between the cone section and the riser sections.

C. Lift pinholes shall be filled with non-shrink grout.

D. Install cast iron frame and cover for each manhole and adjust the frame and cover to proper grade. Frame and cover shall be neatly grouted with non-shrink grout. Riser adjusting rings or brick construction shall be a minimum of 3 inches to a maximum of 12-inches on cone sections and 4-inches on flat tops.

3.08 TESTING GRAVITY LEACHATE SYSTEMS

A. General
1. The Contractor shall supply all materials and equipment required for piping tests, subject to the Project Manager's approval, and shall conduct the tests in the presence of the Project Manager to his satisfaction. Notify the Project Manager a minimum of seven (7) days in advance of all tests.
2. Make repairs to the various systems with new materials. No caulking of threaded joints, cracks, or holes, will be acceptable. Where it becomes necessary to replace pieces of pipe, the replacement shall be the same length material and thickness as the defective piece.
3. Piping shall be backfilled before testing unless otherwise directed by the Project Manager.
4. Leachate pipelines shall be both infiltration and exfiltration tested.

B. Leachate Manhole Risers
1. All leachate manhole risers shall be tested for leakage by plugging pipelines and filling the manhole with water to the top of the manhole. The test period shall be for 24 hours and during the test period, the water level shall not drop.

C. Infiltration Testing of Leachate Systems

1. Infiltration testing shall be in accordance with ASTM C-443.
2. No leakage shall be allowed.
3. If any section of the leachate system fails to meet this requirement, the Contractor shall perform an inspection of the faulty section and repair or replace at his own expense all defective materials or workmanship. The test procedure shall be repeated until the results are acceptable.

D. Exfiltration Testing of Leachate System

1. Plug the pipeline to be tested at the downstream manhole and fill the line with water. The test shall run for 24-hours minimum. The water level inside the manhole should be 2 feet higher than the top of the pipe or 2 feet higher than ground water level, whichever is greater. The maximum internal pipe pressure at the lowest end should not exceed 25 feet of water or 10.8 psi.
2. No leakage shall be allowed.
3. If any section of the leachate system fails to meet this requirement, the Contractor shall repair or replace at his own expense all defective materials or workmanship. The test procedure shall be repeated until the results are acceptable.

3.09 MANHOLE INVERTS

A. Invert channels shall be constructed of smooth and semicircular, conforming to the inside of adjacent sewer section. The mortared invert channel shall have a steel trowel finish. Changes in direction of flow shall be made in a smooth curve of as large a radius as possible. Changes in size and grade shall be made gradually and smoothly. Whenever possible, inverts shall be formed with a full section of pipe laid through the manhole and then breaking out the top half. Benches shall be built up solidly with concrete or brick and mortar and shall be sloping to the invert. All inside drops shall have a flume construction to channel flow into the invert. All pipe entering the manhole must be trimmed flush with the walls. All exposed sharp edges of pipe shall be wiped smooth with mortar.

B. Manhole inverts and benches shall be constructed at the same profile slope as the downstream pipe.

END OF SECTION

SECTION 02451
DUPLEX SUBMERSIBLE LEACHATE PUMP STATION

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The Contractor shall furnish and install one (1) duplex submersible sewage pumping station for pumping Leachate Wastewater to the existing Leachate Pump Station as shown and specified, including all necessary components and equipment to provide a completed and functional facility.

B. The equipment system for each pumping station shall include two (2) explosion proof submersible pumps, non sparking stainless steel pump rail guides, discharge elbows and rail supports, access frame with aluminum access covers, pump lifting chains with hooks, stainless steel cable holder, NEMA 4X Stainless Steel weatherproof control panel, non-mercury switch level controls, and miscellaneous related items of equipment.

C. One (1) company to insure complete component compatibility and operation shall furnish all equipment for each system.

1.02 QUALITY ASSURANCE:

A. Acceptance tests: Services of manufacturers representative per Section 01700.

B. Manufacturer's successful experience in manufacture, operation and servicing of equipment of type, size, quality performance and reliability, equal to that specified.

1.03 REFERENCES:

A. American National Standards Institute (ANSI).

B. American Society of Mechanical Engineers (ASME).

C. Citrus County minimum standard and construction specifications for water and wastewater.

1 04 SUBMITTALS:

A. Contractor shall submit certified Shop Drawings and performance data as outlined in Section 01340 regarding pumps, structure, controls and appurtenances characteristics including:

1. Pump Data:
   a. Outline dimensions and weight
   b. Manufacturers Pump Information Sheet

c. Operating and maintenance instructions and parts list.
d. Operating and nameplate data
e. Manufacturer's size and type
f. Performance curve

2. Access Equipment:
   a. Guide Rail System
   b. Access Grating or Hatch

3. Structural Characteristics:
   a. Outline dimensions and openings.
   b. Concrete reinforcement and concrete strength.

4. Controls Data:
   a. Manufacturer's size and type, circuit diagram.
   b. Enclosure (NEMA rating and locking mechanism)
   c. Operating data float switch controls.
   d. Alarm horn and light data.

B. If equipment proposed substantially differs from arrangement indicated, prepare and submit detailed drawings for review showing all mechanical, electrical and structural changes, arrangement, changes made, at no additional compensation.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Shipping:
   1. Ship equipment, material and spare parts complete, except where partial disassembly is required by transportation regulations or for protection of components.
   2. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended.
   3. Deliver spare parts at same time as pertaining equipment. Delivery to Owner after completion of work.

B. Receiving:
   1. Assume responsibility for equipment material and spare parts just before unloading from carrier at site.
   2. Inspect and inventory items upon delivery to site.
   3. Unload, haul and store items.
   4. Pay all demurrage charges if failed to promptly unload items.

1.06 DESIGN CRITERIA:

A. Each pump shall have operating capacities and conditions as specified on the construction plans. Motor horsepower, voltage and Phase requirements are as indicated on construction plans. The pump shall be non-overloading throughout the entire range of operation without employing service factor. The pump shall reserve a minimum service factor of 1.15. The performance curve submitted for approval shall state in addition to head and capacity performance, the pump efficiency, solid handling capability, and reflect motor service factor.

PART 2 - PRODUCTS

2.01 DESCRIPTION:

A. Submersible sewage pumps, pumping station assembled with pumps, piping, valves, controls, panels, instruments and appurtenances.

2.02 MATERIALS:

A. Submersible Pump/Motor Construction

1. The pumps shall be designed to pump sewage, stormwater, heavy sludge and other fibrous materials without injurious damage during operation. Pump shall be capable of handling raw, unscreened sewage at least three (3) inches in diameter.
2. The pump motor shall be guaranteed to run in a totally partially, or non-submerged condition continuously for a period of twenty-four (24) hours without injurious damages.
3. Pump shall have two (2) mechanical seals with an oil chamber between the seals. All pump fasteners shall be stainless steel. The pump motor-shaft shall be stainless steel.
4. Seal of the pump at the discharge flange, shall be a positive, leak proof system and shall be guaranteed not to leak.
5. Each pump discharge assembly shall have the manufacturer's name, model number, serial number, impeller size and other pertinent data marked on a metal plate.
6. Each motor shall have non-overloading characteristics and shall not overload anywhere on the operating curve. The motors shall have the revolutions per minute, horsepower, voltage, amperage, the manufacturer's name and model number, marked on a metal plate.
7. Pump motor shall be of the explosion proof type.
8. Motors shall operate on three-phase power only, unless specifically approved otherwise by the Owner. Pumps shall be as manufactured by Hydromatic Pumps, Inc., Flygt, or equal.

B. Access Frames and Covers (Wetwell and Valve Vault)

1. Each access cover shall be double or single leaf hinged as specified on construction plans. Access hatch doors shall be lockable aluminum. Doors and frame are to be installed integral with the concrete wetwell pad, by Halliday Products, Inc., US Foundry Co., Bilco Hatch, Inc., or equal, of a size and orientation as shown on the drawings.
2. An aluminum plate cover, ¼" thick, with angle or channel box frame is to be installed over the pump station valve box.
3. Wetwell access frame shall support guide rails stainless steel cable holder. Cover shall be provided with lifting handle and safety latch to hold cover in the open position. Locking hasps shall be furnished for each cover. Cover and frame shall be as manufactured by Halliday Products, US Foundry Co, Bilco Hatch or equal.
4. Contractor shall provide pad locks for the wetwell and valve vault access doors, each keyed alike. Pad locks shall be masters or equal.

C. Electrical Control Panel

1. The duplex pump panel shall be standard duty type. The complete unit shall be housed in a NEMA-4X (Type 304 Stainless Steel) enclosure with provisions for pad locking the door, and a dead front door for mounting controls. All exterior hardware and hinges shall be 304 stainless steel. A BQ frame circuit breaker with handle through inner door and a FVNR starter with three (3) leg overload protection shall be provided for each pump, sized as required. Overloads shall be capable of either manual or automatic reset and shall have a manual trip button to facilitate testing of the overload mechanism. A reset button shall be provided on the door for each overload. Starter coils and contacts shall be easily replaceable with standard hand tools. A rotary type three (3) position selector switch for hand-off-automatic operation and a run pilot light for each pump shall be on the inner door. A DPDT plug-in type alternator relay shall alternate pumps each pumping cycle and provide both pumps run on demand. A one (1) pole, twenty- (20) amp circuit breaker shall be provided for the one hundred twenty (120) volt control circuit for both pumps and the convenience receptacle, G.F.I., mounted on the inner door. Control terminal blocks shall be provided for external connection of float type level controls. Wire shall be minimum #14 gauge in wire duct, wire shall be marked color coded or numbered and fully accessible. The panel shall be fully tested prior to installation and will include the following:

   a. The panel shall have a BQ frame normal breaker for main breaker disconnect with handle through the inner door.
   b. The panel shall have a vapor proof red light mounted on top of the panel for high level alarm visual indication and a red indicator pilot light mounted on the inner door. The alarm light and pilot light shall be prewired to terminals to operate on high-level control signal. Panel will have a push to test switch for the alarm light.
   c. The panel shall have a non-reset type elapsed time meter for each starter mounted on the inner door to record the accumulated running time of each pump. Elapsed time meter for each clock shall record in hours and 1/10 of an hour.
   d. Panel shall have an automatic alternator to alternate the lead pump duty between the pumps successive start cycles.
   e. A transformer shall be furnished and sized according to the total connected load and transformer manufacture's instructions, including convenience receptacle.
   f. Relays and control wiring shall be rated NEMA 300 volt, Furnas electric class 46, or equal. Power terminal blocks shall meet 600-volt creepage and clearance requirements of NEMA and UL for general industrial control equipment and panel boards. Control circuit terminal blocks shall be rated 300 volts as NEMA general industrial control devices.
   g. Audible Alarm - Standard duty audible alarm shall be furnished.
   h. Emergency Generator Power Receptacle – A three phase emergency generator power receptacle shall be provided.

D. Non-Mercury Switch Level Controls and Pressure Transducer

1. Non-Mercury switch level controls shall be Model 3900 as manufactured by Anchor Scientific or equal. Pressure Transducer shall be Bird Cage as manufactured by Blue Ribbon. Switches and Pressure Transducer shall be mounted on a standard stainless steel rack accessible from the hatch cover and in a place that does not interfere with the removal of the pumps. Non-Mercury switch and Pressure Transducer shall be set up as described in the Operation of System.

E. Operation of the System

1. Upon wet well sump level rise, the Pressure Transducer sensors will sense the rising leachate levels and upon the set pressure (second level) being reached, will start the lead pump. With the lead pump operating, the wet well level shall lower to the Pressure Transducer pressure turnoff setting and the pump shall stop. Alternating relay shall index on the stopping of the pump, so that the lag pump will start on the next operation. If the level continues to rise when the lead pump is operating, the pressure setting within the Pressure Transducer (third level) will start the lag pump and activate the visual alarm light. Both the lead and lag pump shall operate together until the pressure setting within the Transducer turns off both pumps.
2. If the level of the wet well should continue to rise when both pumps are operating, the high level non-mercury switch (fourth level) shall be energized and the audible alarm shall be activated. If one (1) pump shall fail for any reason, the second pump shall operate on the override control (third level pressure setting), and the flashing visual alarm light shall activate. If the level shall then rise past the fourth level control, the audible alarm shall be activated. The high level non-mercury switch shall be adjustable, for level setting, from the surface.

F. Wetwell and Accessories

1. The Leachate Lift Station wet well shall be a minimum of six (6) feet inside diameter; reinforced concrete meeting "Standard Specifications for precast reinforced concrete manhole", ASTM C-478-75, latest revision. Cement used in concrete composition shall be Type II acid resistant cement used for sanitary construction. Concrete shall attain a minimum compressive strength of 4,000 psi at twenty-eight (28) days. Wall joints shall be tongue and grooved and so spaced that no piping shall pass through the wet well at a joint. Joints shall be laid full with cement mortar, sealed with double ring "RAM-NEK", or equal, and shall have no voids or other imperfections, and shall be entirely watertight upon completion of construction.
2. Openings in the walls of the wet well for the passage of pipes shall be made by the manufacturer at the time of fabrication or may be made in the field by the contractor, if desired. If holes are made in the field, their maximum dimension shall not exceed one and one-half (1-1/2) times the outside diameter of the pipe passing through the opening. Reinforced steel in the wall shall be cut cleanly and in no circumstances will cut ends be bent so as to turn to the inside or the outside surface. Mechanical pipe

seals shall be used with all cored pipe openings. Interior of cored openings shall receive non-shrinking grout after installation of pipes. Special care shall be taken to insure a watertight connection at these points. Manhole boot or other approved connection to be used with PVC and HDPE pipe. All exterior surfaces of the wet well shall be coated with two (2) coats nine (9) mils each of an epoxy from the list of approved materials of the Citrus County Department of Water Resources. All interior surfaces shall be coated with 1/8" thick Hanson "Agru-sure-grip" concrete protective liner (PPR) or equal.

3. The concrete base upon which the wet well rests shall be constructed of 3750 psi concrete, reinforced to comply with ASTM C-478. The reinforced concrete top of the wet well will be constructed of 4000 psi concrete, reinforced to comply with ASTM C-478 and with a rectangular opening for access to the well. The pumps and/or accessories shall be secured to the concrete base in accordance with the manufacturer's recommendations.
4. Conduit shall enter the wet well and terminate with a fiber bushing. No splices will be allowed in the wet well or conduit. All control and motor cords shall be continuous to the control cabinet.
5. All wiring and grounding shall conform to NEC and local code. All fasteners on the flanges, etc. inside the wet well shall be stainless steel.
6. The supporting soil for the wet well shall be compacted to support with a factor of safety of two (2).

G. Valve Vault and Accessories

1. The valve vault shall be a minimum of six (6) feet by six (6) feet; reinforced concrete meeting "Standard Specifications for precast reinforced concrete manhole", ASTM C-478-75, latest revision. Cement used in concrete composition shall be Type II acid resistant cement used for sanitary construction. Concrete shall attain a minimum compressive strength of 4,000 psi at twenty-eight (28) days.
2. Openings in the walls of the valve vault for the passage of pipes may be made by the manufacturer at the time of fabrication or may be made in the field by the contractor, if desired. If holes are to be made in the field, their maximum dimension shall not exceed one and one-half (1-1/2) times the outside diameter of the pipe passing through the opening. Reinforced steel in the wall shall be cut cleanly and in no circumstances will cut ends be bent so as to turn to the inside or the outside surface. Mechanical pipe seals shall be used for all pipe penetrations unless a factory installed rubber boot is used to seal pipe penetrations. Interior of openings shall be thoroughly filled with non-shrinking grout after installation of mechanical pipe seals. All exterior surfaces of the wet well shall be coated with two (2) coats nine (9) mils each of an epoxy from the list of approved materials of the Citrus County Department of Water Resources. The coats shall be alternating black and white colors.
3. The valve vault shall have a 3-inch floor drain to drain any liquid that may accumulate in the vault to the wetwell. The floor drain shall be provided with adequate slope to properly drain to the wetwell.
4. The supporting soil for the valve vault must be compacted to support with a factor of safety of two (2).

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Install equipment and structure in strict conformance with manufacturer's recommendations plans and specifications.

3.02 ACCEPTANCE TESTS:

A. After installation of equipment and after completion of services of manufacturer's representative, as detailed in Section 01700, operate each unit under normal operating conditions to demonstrate its ability to operate continuously without vibration or overheating and to perform its specified function satisfactorily within five (5) percent of rating. Failure to meet aforementioned requirement is cause for rejection.

B. Correct defects and defective equipment promptly or replace at no additional expense to Owner. Make final adjustments necessary to place equipment in satisfactory working order at time of above tests.

3.03 SPARE PARTS:

A. Contractor to furnish one (1) set of upper and lower pump mechanical seals and two (2) spare BUNA and rubber sealing flanges.

PUMP DATA SHEET

CITRUS COUNTY SOLID WASTE TRANSFER STATION LEACHATE PUMP STATION:

Pump Manufacturer: Hydromatic or approved equal

Model: S4NRC

Type: Submersible, Vortex, Centrifugal Min. 3" Solids Passing

ITEM DESIGN/CONDITION	CRITERIA
Pump design speed (RPM)	1,150
Discharge size (inches)	4"
Impeller size (inches)	7.10"
Primary TDH (feet)	16'
Minimum capacity at primary TDH (GPM)	80
Horsepower	1.5

END SECTION

SECTION 02455
DUPLEX SUBMERSIBLE SEWAGE PUMP STATION

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The Contractor shall furnish and install one (1) duplex submersible sewage pumping station that discharges to the Performance Based Septic System as shown and specified, including all necessary components and equipment to provide a completed and functional facility.

B. The equipment system for each pumping station shall include two (2) submersible pumps, pump rail guides, discharge elbows and rail supports, access frame with aluminum access covers, pump lifting chains with hooks, stainless steel cable holder, NEMA 4X Stainless Steel weatherproof control panel, non-mercury switch level controls, and miscellaneous related items of equipment.

C. One (1) company to insure complete component compatibility and operation shall furnish all equipment for each system.

1.02 QUALITY ASSURANCE:

A. Acceptance tests: Services of manufacturers representative per Section 01700.

B. Manufacturer's successful experience in manufacture, operation and servicing of equipment of type, size, quality performance and reliability, equal to that specified.

1.03 REFERENCES:

A. American National Standards Institute (ANSI)

B. American Society of Mechanical Engineers (ASME)

1.04 SUBMITTALS:

A. Contractor shall submit certified Shop Drawings and performance data as outlined in Section 01340 regarding pumps, structure, controls and appurtenances characteristics including:

1. Pump Data:
   a. Outline dimensions and weight
   b. Manufacturers Pump Information Sheet
   c. Operating and maintenance instructions and parts list.
   d. Operating and nameplate data
   e. Manufacturer's size and type
   f. Performance curve

2. Access Equipment:
   a. Guide Rail System

b. Access Grating or Hatch

3. Structural Characteristics:
   a. Outline dimensions and openings.
   b. Concrete reinforcement and concrete strength.
4. Controls Data:
   a. Manufacturer's size and type, circuit diagram.
   b. Enclosure (NEMA rating and locking mechanism)
   c. Operating data float switch controls.
   d. Alarm horn and light data.

B. If equipment proposed substantially differs from arrangement indicated, prepare and submit detailed drawings for review showing all mechanical, electrical and structural changes, arrangement, changes made, at no additional compensation.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Shipping:
   1. Ship equipment, material and spare parts complete, except where partial disassembly is required by transportation regulations or for protection of components.
   2. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended.
   3. Deliver spare parts at same time as pertaining equipment. Delivery to Owner after completion of work.

B. Receiving:
   1. Assume responsibility for equipment material and spare parts just before unloading from carrier at site.
   2. Inspect and inventory items upon delivery to site.
   3. Unload, haul and store items.
   4. Pay all demurrage charges if failed to promptly unload items.

1.06 DESIGN CRITERIA:

A. Each pump shall have operating capacities and conditions as specified on the construction plans. Motor horsepower, voltage and Phase requirements are as indicated on construction plans. The pump shall be non-overloading throughout the entire range of operation without employing service factor. The pump shall reserve a minimum service factor of 1.15. The performance curve submitted for approval shall state in addition to head and capacity performance, the pump efficiency, solid handling capability, and reflect motor service factor.

PART 2 - PRODUCTS

2.01 DESCRIPTION:

A. Submersible sewage pump, pumping station assembled with pumps, piping, valves, controls, panels, instruments and appurtenances.

2.02 MATERIALS:

A. Submersible Pump/Motor Construction

1. The pumps shall be designed to pump sewage, stormwater, and other fibrous materials without injurious damage during operation. Pump shall be capable of handling raw, unscreened domestic sewage.
2. The pump motor shall be guaranteed to run in a totally partially, or non-submerged condition continuously for a period of twenty-four (24) hours without injurious damages.
3. Pump shall have two (2) mechanical seals with an oil chamber between the seals. All pump fasteners shall be stainless steel. The pump motor-shaft shall be stainless steel.
4. Pump shall be of the grinder type with a two-stage cutter assembly that feeds the incoming flow directly into the pump impeller. The pump grinder shall be capable of grinding all materials found in normal domestic sewage including plastics, rubber, wood, and sanitary waste products, etc. into a fine slurry. Both stationary and rotating cutters shall be constructed of hardened 440C stainless steel to Rockwell C 55-60 hardness.
5. Seal of the pump at the discharge flange, shall be a positive, leak proof system and shall be guaranteed not to leak.
6. Each pump discharge assembly shall have the manufacturer's name, model number, serial number, impeller size and other pertinent data marked on a metal plate.
7. Each motor shall have non-overloading characteristics and shall not overload anywhere on the operating curve. The motors shall have the revolutions per minute, horsepower, voltage, amperage, the manufacturer's name and model number, marked on a metal plate.
8. Motors shall operate on single-phase power only, unless specifically approved otherwise by the Owner. Pumps shall be as manufactured by Zoeller Company, Myers, or equal.

B. Access Frames and Covers (Wetwell and Valve Vault)

1. Each access cover shall be double or single leaf hinged as specified on construction plans. Access hatch doors shall be lockable aluminum. Doors and frame are to be installed integral with the concrete wetwell pad, by Halliday Products, Inc., US Foundry Co., Bilco Hatch, Inc., or equal, of a size and orientation as shown on the drawings.
2. An aluminum plate cover, ¼" thick, with angle or channel box frame is to be installed over the pump station valve box.
3. Wetwell access frame shall support guide rails stainless steel cable holder. Cover shall be provided with lifting handle and safety latch to hold cover in the open position. Locking hasps shall be furnished for each cover. Cover and frame shall be as manufactured by Halliday Products, US Foundry Co, Bilco Hatch or equal.
4. Contractor shall provide pad locks for the wetwell and valve vault access doors, each keyed alike. Pad locks shall be masters or equal.

C. Electrical Control Panel

1. The duplex pump panel shall be standard duty type. The complete unit shall be housed in a NEMA-4X (Type 304 Stainless Steel) enclosure with

provisions for pad locking the door, and a dead front door for mounting controls. All exterior hardware and hinges shall be 304 stainless steel. A BQ frame circuit breaker with handle through inner door and a FVNR starter with three (3) leg overload protection shall be provided for each pump, sized as required. Overloads shall be capable of either manual or automatic reset and shall have a manual trip button to facilitate testing of the overload mechanism. A reset button shall be provided on the door for each overload. Starter coils and contacts shall be easily replaceable with standard hand tools. A rotary type three (3) position selector switch for hand-off-automatic operation and a run pilot light for each pump shall be on the inner door. A DPDT plug-in type alternator relay shall alternate pumps each pumping cycle and provide both pumps run on demand. A one (1) pole, twenty- (20) amp circuit breaker shall be provided for the one hundred twenty (120) volt control circuit for both pumps and the convenience receptacle, G.F.I., mounted on the inner door. Control terminal blocks shall be provided for external connection of float type level controls. Wire shall be minimum #14 gauge in wire duct, wire shall be marked color coded or numbered and fully accessible. The panel shall be fully tested prior to installation and will include the following:

a. The panel shall have a BQ frame normal breaker for main breaker disconnect with handle through the inner door.

b. The panel shall have a vapor proof red light mounted on top of the panel for high level alarm visual indication and a red indicator pilot light mounted on the inner door. The alarm light and pilot light shall be prewired to terminals to operate on high-level control signal. Panel will have a push to test switch for the alarm light.

c. The panel shall have a non-reset type elapsed time meter for each starter mounted on the inner door to record the accumulated running time of each pump. Elapsed time meter for each clock shall record in hours and 1/10 of an hour.

d. Panel shall have an automatic alternator to alternate the lead pump duty between the pumps successive start cycles.

e. A transformer shall be furnished and sized according to the total connected load and transformer manufacture's instructions, including convenience receptacle.

f. Relays and control wiring shall be rated NEMA 300 volt, Furnas electric class 46, or equal. Power terminal blocks shall meet 600-volt creepage and clearance requirements of NEMA and UL for general industrial control equipment and panel boards. Control circuit terminal blocks shall be rated 300 volts as NEMA general industrial control devices.

g. Audible Alarm - Standard duty audible alarm shall be furnished.

h. Emergency Generator Power Receptacle – A three phase emergency generator power receptacle shall be provided.

D. Non-Mercury Switch Level Controls and Pressure Transducer

1. Non-Mercury switch level controls shall be Model 3900 as manufactured by Anchor Scientific or equal. Pressure Transducer shall be Bird Cage as manufactured by Blue Ribbon. Switches and Pressure Transducer shall be mounted on a standard stainless steel rack accessible from the hatch cover and in a place that does not interfere with the removal of the pumps. Non-

Mercury switch and Pressure Transducer shall be set up as described in the Operation of System.

E. Operation of the System

1. Upon wet well sump level rise, the Pressure Transducer sensors will sense the rising sewage levels and upon the set pressure (second level) being reached, will start the lead pump. With the lead pump operating, the wet well level shall lower to the Pressure Transducer pressure turnoff setting and the pump shall stop. Alternating relay shall index on the stopping of the pump, so that the lag pump will start on the next operation. If the level continues to rise when the lead pump is operating, the pressure setting within the Pressure Transducer (third level) will start the lag pump and activate the visual alarm light. Both the lead and lag pump shall operate together until the pressure setting within the Transducer turns off both pumps.
2. If the level of the wet well should continue to rise when both pumps are operating, the high level non-mercury switch (fourth level) shall be energized and the audible alarm shall be activated. If one (1) pump shall fail for any reason, the second pump shall operate on the override control (third level pressure setting), and the flashing visual alarm light shall activate. If the level shall then rise past the fourth level control, the audible alarm shall be activated. The high level non-mercury switch shall be adjustable, for level setting, from the surface.

F. Wetwell and Accessories

1. The Lift Station wet well shall be a minimum of four (4) feet inside diameter; reinforced concrete meeting "Standard Specifications for precast reinforced concrete manhole", ASTM C-478-75, latest revision. Cement used in concrete composition shall be Type II acid resistant cement used for sanitary construction. Concrete shall attain a minimum compressive strength of 4,000 psi at twenty-eight (28) days. Wall joints shall be tongue and grooved and so spaced that no piping shall pass through the wet well at a joint. Joints shall be laid full with cement mortar, sealed with double ring "RAM-NEK", or equal, and shall have no voids or other imperfections, and shall be entirely watertight upon completion of construction.
2. Openings in the walls of the wet well for the passage of pipes shall be made by the manufacturer at the time of fabrication or may be made in the field by the contractor, if desired. If holes are made in the field, their maximum dimension shall not exceed one and one-half (1-1/2) times the outside diameter of the pipe passing through the opening. Reinforced steel in the wall shall be cut cleanly and in no circumstances will cut ends be bent so as to turn to the inside or the outside surface. Mechanical pipe seals shall be used with all cored pipe openings. Interior of cored openings shall receive non-shrinking grout after installation of pipes. Special care shall be taken to insure a watertight connection at these points. Manhole boot or other approved connection to be used with PVC pipe. All exterior surfaces of the wet well shall be coated with two (2) coats nine (9) mils each of an epoxy from the list of approved materials of the Citrus County Department of Water Resources. All interior surfaces shall be coated with 1/8" thick Hanson "Agru-sure-grip" concrete protective liner (PPR) or equal.
3. The concrete base upon which the wet well rests shall be constructed of 3750 psi concrete, reinforced to comply with ASTM C-478. The reinforced

concrete top of the wet well will be constructed of 4000 psi concrete, reinforced to comply with ASTM C-478 and with a rectangular opening for access to the well. The pumps and/or accessories shall be secured to the concrete base in accordance with the manufacturer's recommendations.

4. Conduit shall enter the wet well and terminate with a fiber bushing. No splices will be allowed in the wet well or conduit. All control and motor cords shall be continuous to the control cabinet.
5. All wiring and grounding shall conform to NEC and local code. All fasteners on the flanges, etc. inside the wet well shall be stainless steel.
6. The supporting soil for the wet well shall be compacted to support with a factor of safety of two (2).

G. Valve Vault and Accessories

1. The valve vault shall be a minimum of four (4) feet by four (4) feet; reinforced concrete meeting "Standard Specifications for precast reinforced concrete manhole", ASTM C-478-75, latest revision. Cement used in concrete composition shall be Type II acid resistant cement used for sanitary construction. Concrete shall attain a minimum compressive strength of 4,000 psi at twenty-eight (28) days.
2. Openings in the walls of the valve vault for the passage of pipes may be made by the manufacturer at the time of fabrication or may be made in the field by the contractor, if desired. If holes are to be made in the field, their maximum dimension shall not exceed one and one-half (1-1/2) times the outside diameter of the pipe passing through the opening. Reinforced steel in the wall shall be cut cleanly and in no circumstances will cut ends be bent so as to turn to the inside or the outside surface. Mechanical pipe seals shall be used for all pipe penetrations unless a factory installed rubber boot is used to seal pipe penetrations. Interior of openings shall be thoroughly filled with non-shrinking grout after installation of mechanical pipe seals. All exterior surfaces of the wet well shall be coated with two (2) coats nine (9) mils each of an epoxy from the list of approved materials of the Citrus County Department of Water Resources. All interior surfaces shall be coated with 1/8" thick Hanson "Agru-sure-grip" concrete protective liner (PPR) or equal.
3. The valve vault shall have a 3-inch floor drain to drain any liquid that may accumulate in the vault to the wetwell. The floor drain shall be provided with adequate slope to properly drain to the wetwell.
4. The supporting soil for the valve vault must be compacted to support with a factor of safety of two (2).

2.03 WARRANTY:

A. The grinder pump manufacturer shall provide a part(s) and labor warranty on the complete station and accessories, including, but not limited to, panel and redundant check valve, for a period of twenty-four (24) months after notice of Owner's acceptance. The owner will report any defects found during the warranty period to the manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Install equipment and structure in strict conformance with manufacturer's recommendations plans and specifications.

3.02 ACCEPTANCE TESTS:

A. After installation of equipment and after completion of services of manufacturer's representative, as detailed in Section 01700, operate each unit under normal operating conditions to demonstrate its ability to operate continuously without vibration or overheating and to perform its specified function satisfactorily within five (5) percent of rating. Failure to meet aforementioned requirement is cause for rejection.

B. Correct defects and defective equipment promptly or replace at no additional expense to Owner. Make final adjustments necessary to place equipment in satisfactory working order at time of above tests.

3.03 SPARE PARTS:

A. Contractor to furnish one (1) set of upper and lower pump mechanical seals and two (2) spare BUNA and rubber sealing flanges.

PUMP DATA SHEET

CITRUS COUNTY SOLID WASTE TRANSFER STATION SEPTIC SYSTEM PUMP STATION

Pump Manufacturer:	Zoeller Company or engineer approved equal
Model:	810
Type:	Submersible, Grinder

ITEM DESIGN/CONDITION	CRITERIA
Pump design speed (RPM)	1,725
Discharge size (inches)	1.25"
Primary TDH (feet)	13'
Minimum capacity at primary TDH (GPM)	15'
Horsepower	16
Power requirements	230/1/60

END OF SECTION

SECTION 02456
AEROBIC DRIP TAPE SEPTIC SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. This specification gives a general description of a 600-gallon per day performance based septic system. The system shall be built by a single manufacturer. Equipment/structures shall include a five-stage treatment system, sectioned precast concrete tank, PVC process piping, aeration system piping, aeration system blower, discharge pump and solid-state system controller. The discharge pump shall route treated wastewater to and from the drip tape effluent disposal leachfield. The manufacturer of the system shall provide a single source responsibility for the manufacture and service of the system. This specification covers the minimum requirements; however, it does not cover all details, which may vary in accordance with the requirements of the offered equipment.

B. System shall treat domestic wastewater to effluent levels of the following:

1. Total Suspended Solids (TSS) - <10.0 mg/L
2. Five day Carbonaceous Biochemical Oxygen Demand (CBOD5) - <10 mg/L
3. Total Nitrogen (TN) - < 20 mg/L
4. Total Phosphorous (TP) - <10 mg/L

C. There is no disinfection requirement for the system.

D. System shall be constructed by a licensed septic system contractor. Contractor shall be responsible for obtaining a Citrus County Health Department permit for construction of the system.

1.02 REFERENCES:

A. CCDWR MSCSWE: Citrus County Department of Water Resources, Utilities Division "Minimum Standards & Construction Specifications For Water & Wastewater Systems", Latest Edition, including all amendments. .

B. UD: Citrus County Department of Water Resources, Utilities Division.

1.03 SUBMITTALS:

A. Submittals shall be in accordance with Section 01340 and include copies of all materials required to establish compliance with these specifications. At a minimum, they shall include the following:

1. Shop drawings showing important details of construction and unit dimensions.
2. Descriptive literature, bulletins, and/or catalog cuts of the equipment.
3. A detailed description of the system operation, including airflow rates, influent flow rates, effluent pump rates, and controller functionality.
4. Performance curves and data sheets for pumps and blowers shall be provided.
5. System electrical requirements shall be detailed on the shop drawings.
6. Total weight of the equipment.
7. Bill of Materials for the system.

8. Electrical information, including control schematic, panel layout, motor specifications.

1.04 SUPPLIERS

A. The performance based septic system shall be as manufactured by Hoot Systems, Inc. Lake Charles, LA or an engineer approved equal.

1.05 WARRANTY

A. The performance based septic system shall be covered against defects in material and workmanship for a period of twelve (12) months from start-up.

1.06 PRODUCT SUPPORT

A. The performance based septic system manufacturer shall provide factory-direct service personnel to assist in installation, start-up, preventative maintenance and general service of the system. A factory direct, service technician must be located within 100 miles of the project site. The performance based septic system manufacturer must have on-call service technicians.

PART 2 - MECHANICAL EQUIPMENT

2.01 PRECAST CONCRETE TANK

A. The system shall include a five (5) stage, three (3) compartment precast concrete tank. Tank shall have a minimum of 6 access covers to maintain the process equipment. The first compartment shall be a pretreatment tank for flow equalization and settling. The second compartment shall be for aeration. The third compartment shall be for clarification. The forth area shall be for disinfection equipment (not used) and the fifth compartment shall be a holding tank that houses the system discharge pump.

B. The pretreatment area volume shall be a minimum of 400 gallons. The aeration area shall be 715 gallons. The clarification area shall be 205 gallons. The holding tank area shall be 740 gallons minimum.

C. Precast Concrete Tank shall meet all the requirements of specifications section 03310 – Pre-Engineered Precast Concrete.

D. Minimum dimensions of the treatment system tank (all three compartments) shall be 13'-4" long by 6'-2" wide by 5'-9" deep.

2.02 SYSTEM BLOWER

A. System blower shall be 120vac; 2.18 psi, rated for 2.4 cfm, 60 watts, rated for continuous operation.

B. The blower shall have an 11/16" discharge diameter.

C. The blower shall be of the linear design.

D. The blower shall be one (1) Model AL-60 as manufactured by Troy Air; Alita Arcadia, CA or engineer approved equal.

2.03 PE TANK ACCESS RISERS

A. Tank risers shall be furnished and installed as shown on the contract drawings.

B. Tank adaptor rings, risers, safety pans, safety lids, and riser lids shall be products from Tuf-Tite Products Lake Zurick, IL.

2.04 SYSTEM PIPING

A. System blower piping shall be Schedule 80 PVC.

B. System wastewater piping shall be Schedule 80 PVC.

2.05 SYSTEM EFFLUENT PUMP AND PIPING

A. Effluent from the performance base septic system shall be pumped to the ½" drip tape leach field by a submersible vertical turbine pump.

B. Specifications for the drip tape system leachfield are shown on the contract drawings. Leachfield drip tape piping shall have slits at one-foot intervals.

C. Effluent pump discharge fitting shall be 1 ¼".

D. Effluent pump filter shall be furnished and installed as shown on the contract drawings.

E. System discharge piping shall be Schedule 80 cement weld PVC.

F. Piping to and from the leachfield disposal site shall be 1 ½" Schedule 80 cement weld PVC.

G. Pump flow range shall be 3-16 gpm. System total dynamic head shall be 115 feet at a flow rate of 14.8 gpm.

H. System Effluent pump shall be Model 12EB 05 12J as manufactured by ITT Goulds or engineer approved equal.

2.06 SPARE PARTS

A. No spare parts shall be provided.

2.07 BOLTS

A. All bolts, nuts, and miscellaneous hardware shall be 304 stainless steel for corrosion resistance. Bolts shall be grade 5, minimum.

2.08 CHECK VALVES

A. Check valves shall be as listed on the Citrus County approved list of check valve manufacturers.

2.09 PUMP AND STATION ISOLATION VALVES

A. Isolation valves shall be as listed on the Citrus County approved list of wastewater valve manufacturers.

2.10 SYSTEM CONTROLLER

A. Performance based system shall have a solid-state system controller, compatible with Data Flow Systems. Controller shall operate the system blower, system effluent pump, system ancillaries and system alarms.

B. The control cabinet with controls must be UL 508A listed as a complete assembly by the system supplier. All wiring shall be in accordance with the latest N.E.C. codes.

C. Control cabinet shall be NEMA 3R rated.

D. System alarms annunciated by the controller include, effluent pump over pressure, water over use alarm, low air pressure, and power outage.

E. Controller shall have auto dialer feature for telephone contact of emergency personnel for alarm conditions.

F. Controller shall operate on 120volt single-phase power. Surge protection and lightning protection shall be provided. Power for the system is from the power center in the HHW building.

G. Controller shall be mounted on stainless steel 1 5/8" unistrut adjacent to the performance based treatment system.

2.11 WIRING

A. All external wiring shall be enclosed in conduit. All power wire shall be stranded and sized as required for load and application according to the National Electric Code.

2.12 CONDUIT

A. All external wiring shall be enclosed in rigid and flexible conduit. PVC conduit shall be rigid Schedule 80, sunlight resistant and shall be UL listed (UL 651) and shall comply with Federal Specification WC-1094 and NEMATC-2. Liquid tight flexible nonmetallic conduit shall be UL listed (UL 1660) and shall be Carlon Carflex liquid tight flexible nonmetallic conduit or equivalent. Liquid tight nonmetallic connectors shall be UL listed (UL 514B) and shall be Carlon Carflex liquid tight nonmetallic fittings or equivalent. Each section of flexible nonmetallic conduit shall not exceed 6 feet in length.

B. For the purposes of routing and spacing conduit, conductor cables shall be divided into the following two categories:
   1. Category 1 conductors shall include AC power lines,
   2. Signal related conductors.

C. The System Controller shall be located in such a fashion as to prevent the signal conduit and power conduit from crossing. If a crossover of power conduit and signal conduit is unavoidable, then the crossover must occur at a right angle.

PART 3 - EXECUTION

3.01 INSTALLATION & FIELD TESTING

A. The system shall be installed in accordance with the manufacturer's requirements.

B. A minimum of two (2) eight-hour days of start-up service shall be provided. One day of service shall be provided at initial commission with the second day being provided approximately one month after initial start-up. The second day shall be used to fine-tune the system operation and to provide follow-up training. Field tests will not be conducted until such time as the entire installation is complete and ready for operation. This includes the completion of all piping, electrical connections and inspections, and availability of supply water. During start-up the system supplier shall run the system through a normal system cycle. The system supplier shall make any adjustments and correct any defects at no cost to the owner. Tests shall be performed until satisfactory results are obtained. A training session shall be performed at the time of start-up.

C. Upon successful startup, the system manufacturer's representative shall provide a letter stating that the system has been installed properly, is operating correctly and is eligible for warranty coverage.

3.02 OPERATION AND MAINTENANCE MANUALS

A. Two (2) complete sets of operation and maintenance manuals shall be provided. At a minimum, the manuals shall include:
   1. Shop drawings showing important details of construction and dimensions.
   2. Descriptive literature, bulletins, and/or catalogs of the equipment.
   3. A detailed description of the system operation, including pressure and flow ranges, pump staging, and controller functionality.
   4. System Guaranteed performance curves and data sheets on the pumps showing head, capacity, efficiency, NPSHR, and design and maximum horsepower.
   5. Total weight of the equipment.
   6. Complete Bill of Materials for the system.
   7. Electrical information, including control schematic and panel layout.
   8. Manufacturer's Operation and Maintenance Manuals with parts cross-sections.
   9. Recommended spare parts.
   10. Contact phone numbers for troubleshooting and service.

B. Operation and maintenance manuals shall be provided in both hardcopy and PDF format.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI):
   a. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
   b. 301, Specifications for Structural Concrete.
   c. 302.1R, Guide For Concrete Floor and Slab Construction.
   d. 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
   e. 305R, Hot Weather Concreting.
   f. 306.1, Standard Specification for Cold Weather Concreting.
   g. 309R, Guide for Consolidation of Concrete.
2. ASTM International (ASTM):
   a. C31/C31M, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   b. C33, Standard Specification for Concrete Aggregates.
   c. C39/C39M, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   d. C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
   e. C94/C94M, Standard Specification for Ready-Mixed Concrete.
   f. C143/C143M, Standard Test Method for Slump of Hydraulic Cement Concrete.
   g. C150, Standard Specification for Portland Cement.
   h. C157/C157M, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
   i. C192/C192M, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
   j. C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   k. C260, Standard Specification for Air-Entraining Admixtures for Concrete.
   l. C311, Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete.
   m. C452, Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate.
   n. C494/C494M, Standard Specification for Chemical Admixtures for Concrete.

o. C595, Standard Specification for Blended Hydraulic Cements.
p. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
q. C1012, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
r. C1218/C1218M, Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
s. D4580, Standard Practice for Measuring Delaminations in Concrete Bridge Decks by Sounding.
t. E1155, Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.

3. National Institute of Standards and Technology (NIST): Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.
4. National Ready Mixed Concrete Association (NRMCA).

1.02 DEFINITIONS

A. Architectural Concrete: Concrete that is exposed as an interior or exterior surface in the completed structure that contributes to visual character of the completed structure, as indicated on Drawings. Tranfer building will have architectural concrete treatment. See Specification 03100 Concrete Formwork.

B. Defective Areas: Surface defects that include honeycomb, rock pockets, indentations greater than 3/16 inch, cracks 0.005 inch wide and larger, as well as a crack that leaks for liquid containment basins and belowgrade habitable spaces; cracks 0.010 inch wide and larger in nonfluid holding structures spalls, chips, air bubbles greater than 3/4 inch in diameter, pinholes, bug holes, embedded debris, lift lines, sand lines, bleed lines, leakage from form joints, fins and other projections, form popouts, texture irregularities, and stains and other color variations that cannot be removed by cleaning.

C. Exposed Concrete: Concrete surfaces that can be seen inside or outside of structures regardless whether concrete is above water, dry at all times, or can be seen when structure is drained.

D. Hydraulic Structures: Structures that either contain or retain liquid.

E. New Concrete: Less than 60 days old.

F. Slurry Concrete: Mixture of sand, 3/8-inch minus aggregate, cement, and water for wall construction joints.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Product Data: Admixtures, bonding agent, bond breaker, and patching materials.
   b. Design Data: Concrete mix designs signed by Civil Engineer Registered in State of Florida or state DOT approved mix designer in the State of Florida
   c. Placement Drawings: Concrete, identifying location of each type of construction joint.
   d. Gradation for coarse and fine aggregates, and combined together. List gradings, percent passing through each sieve size.
   e. Detailed plan for cold weather curing and protection of concrete placed and cured in weather below 40 degrees F.
   f. Detailed plan for hot weather placements including curing and protection for concrete placed in ambient temperatures over 80 degrees F.
   g. Concrete repair methods and materials.
2. Samples:
   a. One Sample of each type of architectural concrete wall finish, 24 inches by 24 inches square by 1-1/2 inches thick.
   b. Prior to starting work on mockup panels, submit Sample for slab finish Type S-4, 24 inches by 24 inches square by 1-1/2 inches thick.
   c. Demonstrate use of bonding agent.

B. Informational Submittals:

1. Preinstallation Conference minutes.
2. Manufacturer's application instructions for bonding agent and bond breaker.
3. Fiber Manufacturer's Written Instructions:
   a. Adding fiber reinforcing to batching.
   b. Water-cement ratio of fiber-reinforced concrete fill.
   c. Mixing of fiber-reinforced concrete fill.
4. Manufacturers' Certificate of Compliance:
   a. Portland cement.
   b. Ground granulated blast furnace slag.
   c. Admixtures.
   d. Aggregates.
   e. Bonding agent.
   f. Bond breaker.
   g. Cement used in architectural concrete.

5. Statements of Qualification:
   a. Mix designer.
   b. Batch plant.
6. Test Reports:
   a. Source test analysis report for fly ash, including percentage of chloride content, and chemical ingredients.
   b. Statement identifying aggregates reactivity. Determine water soluble chloride in each component of aggregates in accordance with ASTM C1218/C1218M.
   c. For each trial concrete mix design and signed by a qualified mix designer.
   d. Cylinder compressive test results for laboratory concrete mixes.
7. Concrete Delivery Tickets:
   a. For each batch of concrete before unloading at Site.
   b. In accordance with ASTM C94/C94M, Section 14, including requirements 14.2.1 through 14.2.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Mix Designer: Licensed professional engineer registered in the State of Florida or state DOT approved mix designer in the State of Florida.
2. Batch Plant: Currently certified by the National Ready Mixed Concrete Association.
3. Proof that concrete subcontractor has had experience in the use of formliners and verification that the concrete mix is compatible with the proposed formliner.
4. Submittal: Complete information of the formliner and accessories to be used on this Project.
5. Use of the formliner specified for the exterior walls of the Transfer Station Building is to be accomplished in compliance with manufacturer's recommendations.

B. Mockup Panels:

1. Construct one panel for each form liner type specified in Section 03100, Concrete Forming and Accessories.
2. Construct mockup panels to demonstrate wall finish Types W-7, W-8, W-9, W-10, and W-11; slab finish Types S-4, S-5, and S-6.
   a. Minimum dimensions 10 feet by 8 feet.
   b. Demonstrate sandblasting on Types W-10 and W-11 to show how uniform appearance will be achieved regardless of age of concrete.
3. Before concrete work starts, construct panels with specified materials, forming systems, reinforcing details, and leakage prevention techniques.

4. Show architectural details, joints, form ties, form liners, and rebar spacers to produce finished surface required.
5. Test form release agent on one mockup panel to ensure no adverse effects are caused on form or form liner materials.
6. Cast panels from minimum of 3-cubic yard truck mixer load.
7. Surface finish uniform in appearance as Samples.
8. Approved panels shall establish standards of quality by which concrete work will be judged.
9. Replace panels if not representative of Work as specified.
10. Panels may be incorporated into Work if approved by Engineer.
11. Construct additional 10-foot by 8-foot panel or use Engineer-selected portion of as-cast wall surface hidden from view to develop and test patching techniques and mixes.
12. Construct additional panels and use to demonstrate repair material and application procedures and obtain approval prior to using material to repair project structures.]

C. Preinstallation Conference:

1. Required Meeting Attendees:
   a. Contractor, including pumping, placing and finishing, and curing subcontractors.
   b. Ready-mix producer.
   c. Admixture representative.
   d. Testing and sampling personnel.
   e. Engineer.
2. Schedule and conduct prior to incorporation of respective products into Project. Notify Engineer of location and time.
3. Agenda shall include:
   a. Admixture types, dosage, performance, and redosing at Site.
   b. Mix designs, test of mixes, and Submittals.
   c. Placement methods, techniques, equipment, consolidation, and form pressures.
   d. Slump and placement time to maintain slump.
   e. Finish, curing, and water retention.
   f. Protection procedures for weather conditions.
   g. Other specified requirements requiring coordination.
4. Conference minutes as specified in Section 01200, Project Meetings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cement: Furnish from one source.

1. Portland Cement Type I or Type II:
   a. Meet ASTM C150.
   b. Alkalies: Maximum 0.60 percent.
   c. Tricalcium Aluminate Content of Type I Cement: Maximum 10 percent.
   d. All Structures: Type II cement or combination of Type I mixed with fly ash.
   e. Combine fly ash with cement at batch plant or during production of cement in accordance with ASTM C595, Type IP cement.

B. Ground Granulated Blast Furnace Slag (GGBFS): In accordance with ASTM C989, Grades 100 or 120.

C. Aggregates: Furnish from one source.

1. Natural Aggregates:
   a. Free from deleterious coatings and substances in accordance with ASTM C33, except as modified herein.
   b. Free of materials and aggregate types causing popouts, discoloration, staining, or other defects on surface of concrete.
2. Nonpotentially Reactive: In accordance with ASTM C33, Appendix XI, Paragraph X1.1.
3. Aggregate Soundness: Test for fine and coarse aggregates in accordance with ASTM C33 and ASTM C88 using sodium sulfate solution.
4. Fine Aggregates:
   a. Clean, sharp, natural sand.
   b. ASTM C33.
   c. Materials Passing 200 Sieve: 4 percent maximum.
   d. Limit deleterious substances in accordance with ASTM C33, Table 1 with material finer than 200 sieve limited to 3 percent, coal and lignite limited to 0.5 percent.
5. Coarse Aggregate:
   a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).
   b. Materials Passing 200 Sieve: 0.5 percent maximum.
   c. Limit deleterious substances in accordance with ASTM C33, Table 3 for exposed concrete.
6. Special Aggregates for Exposed Aggregate Finishes: Uniform, hard, sound, and clean, color shall match Sample.

D. Admixtures: Furnish from one manufacturer.

1. Characteristics: Compatible with each other and free of chlorides or other corrosive chemicals.
2. Air-Entraining Admixture:
   a. ASTM C260, nontoxic after 30 days and contains no chlorides.
   b. Concrete with air-entrainment admixture added shall maintain air percentage as batched, within plus or minus 2 percent for time required for placement into structure.
3. Water-Reducing Admixture: ASTM C494/C494M, Type A or Type D.
   a. Manufacturers and Products:
      1) BASF Admixtures Inc., Shakopee, MN; Pozzolith Series or Polyheed Series.
      2) Euclid Chemical Co., Cleveland, OH; Eucon WR Series.
      3) W. R. Grace & Co., Cambridge, MA; WRDA Series.
4. High Range Water Reducing Admixture (Superplasticizer):
   a. ASTM C494/C494M.
   b. Hold slump of 5 inches or greater for time required for placement.
   c. Furnish type as recommended by manufacturer for allowed temperature ranges.
   d. Type F or G.
   e. Manufacturers and Products:
      1) BASF Admixtures Inc., Shakopee, MN; Rheobuild 1000 or Polyheed Series.
      2) Euclid Chemical Co., Cleveland, OH; Eucon 37 ir 537.
      3) W. R. Grace & Co., Cambridge, MA; Daracem Series or ADVA Series.
5. Shrinkage Reducing Admixture:
   a. Use of shrinkage reducing admixture is optional.
   b. Manufacturers and Products:
      1) BASF Admixtures Inc., Shakopee, MN; Tetraguard AS20.
      2) Euclid Chemical Co., Cleveland, OH; Eucon SRA.
6. Fly Ash (Pozzolan): Class F fly ash in accordance with ASTM C618, except as modified herein:
   a. ASTM C618, Table 1, Loss on Ignition: Maximum 3 percent.
   b. ASTM C618, Table 2, Water Requirement: Maximum 100 percent of control.
   c. ASTM C618, Table 3, Effectiveness in Controlling Alkali-Silica Reaction: Maximum 100 percent expansion of test mixture as a percentage of low-alkali cement control at 14 days.
   d. ASTM C618, Table 3, Uniformity Requirements: Apply when loss on ignition of fly ash furnished exceeds 3 percent.
   e. ASTM C618, Table 3, Effectiveness in Contributing to Sulfate Resistance: Procedure A after 6-month sulfate exposure, maximum 0.05 percent.

f. ASTM C618, Table 3, Effectiveness in Contributing to Sulfate Resistance: Procedure B, expansion of test mixture as a percentage of sulfate resistance cement control, after at least 6-month exposure, maximum 100 percent.

g. [ ]

h. For fly ash not meeting requirements of chemical ratio for CaO listed in the previous paragraph, furnish the following:
   1) Test fly ash in accordance with ASTM C1012.
   2) Furnish test data confirming fly ash in combination with cement used meets strength requirements, is compatible with air-entraining agents and other additives, provides increased sulfate resistance equivalent to or better than Type II cement.
   3) Conduct tests using proposed fly ash and cement samples together with control samples using Type II cement without fly ash.

7. Silica Fume Mineral Admixture: As specified in Section 03351, High-Strength Concrete

E. Water: In accordance with ASTM C1602/C1602M, except maximum content of chloride ions shall be 500 ppm.

2.02 SLURRY CONCRETE FOR HORIZONTAL CONSTRUCTION JOINTS IN WALLS

A. Flowable, consisting of sand, 3/8-inch minus aggregate, water, and minimum 1,128 pounds of cement per cubic yard.

2.03 ANCILLARY MATERIALS

A. Crack Repair Epoxy Manufacturers: As specified in Section 03740, Concrete Repair Crack Injection.

B. Bonding Agent:

1. Furnish two-component epoxy.
2. Consult manufacturer for surface finish, pot life, set time, vertical or horizontal application, and forming restrictions.
3. Manufacturers and Products:
   a. BASF Building Systems Inc., Shakopee, MN; Concresive.
   b. Euclid Chemical Co., Cleveland, OH; Euco Epoxy System.
   c. Sika Chemical Corp., Lyndhurst, NJ; Sikadur 32.

C. Bond Breaker:

1. Nonstaining type, providing positive bond prevention.
2. Manufacturers and Products:
   a. Burke Co., San Mateo, CA; Burke Clean Lift Bond Breaker or Burke Tilt Free Bond Breaker.
   b. Nox-Crete Products Group, Omaha, NE; Silcoseal Select.
   c. Williams Distributors, Inc., Seattle, WA; Williams Tilt-Up Compound.

D. Repair Material:

1. Contain no chlorides or other chemicals causing steel corrosion.
2. Repair mortar specifically mixed and then tested at Job Site for appearance compatibility prior to use in exposed areas.
3. Low pressure spray or hand applied silica fume mortar, for vertical and overhead repair, as specified in Section 03720, Vertical and Overhead Concrete Surfaces Repair Systems.
4. Repair mortar system submitted and approved for horizontal concrete surface repairs from list of repair mortars in Section 03722, Horizontal Concrete Surfaces Repair Systems.
5. Crack repair material as specified in Section 03740, Concrete Repair Crack Injection.

2.04 CONCRETE MIX DESIGN

A. Design: Select and proportion ingredients using trial batches; sample, cure and test concrete mix through approved independent testing laboratory in accordance with ACI 301.

1. Concrete Compressive Strength, F'c:
   a. 4,500psi at 28 days, unless otherwise shown, except 3,000 psi at 28 days for secondary concrete elements such as curbs, sidewalks, and pipe/conduit encasements. 8,000 psi for tipping floor concrete as shown on the Drawings and specified in Section 03351, High Strength Concrete.
   b. Design lab-cured trial mix cylinders.
   c. Use additional cement or cement plus fly ash above minimum specified if required to meet average compressive strength, F'cr.
   d. Use F'cr as basis for selection of concrete proportions as set forth in ACI 301.
   e. F'cr: Equal to F'c plus 1,200 when data are not available to establish standard deviation.

2. Concrete Fill:
   a. Design for 2,500 psi at 28 days using 1-inch aggregate, 4-inch maximum slump and 0.46 maximum water to cementitious materials ratio.
   b. Use water-reducing admixture.
   c. Provide fiber reinforcing in accordance with Section 03240, Fiberous Reinforcing.

B. Proportions:

1. Design mix to meet aesthetic and structural concrete requirements.
2. Unless specifically stated otherwise, water to cementitious materials ratio shall control amount of total water added to concrete as follows:

Water to Cementitious Materials Ratio		
Coarse Aggregate Size	**Maximum W/C Ratio w/ Superplasticizer**	**Maximum W/C Ratio w/o Superplasticizer**
1-1/2"	0.40	0.44
1"	0.39	0.43
3/4"	0.38	0.42

3. Minimum Cementitious Materials Content:
   a. 517 pounds per cubic yard for concrete with 1-1/2-inch maximum size aggregate.
   b. 540 pounds per cubic yard for 1-inch maximum size aggregate.
   c. 564 pounds per cubic yard for 3/4-inch maximum size aggregate.
   d. Increase cementitious materials content as required to obtain strength requirements and water-cement ratio.

C. Aggregate Shrinkage Effects: Design mix for shrinkage characteristics of aggregate. Test for shrinkage in accordance with ASTM C157/C157M with the following modifications:

1. Prisms shall be moist cured for 7 days prior to 28-day drying period.
2. Comparator reading at end of 7-day moist cure shall be used as the initial length in the length change calculation.
3. Reported results shall be the average of three prisms.
4. Results at end of 28-day drying period shall not exceed 0.045 percent if 3-inch prisms are used, or exceed 0.042 percent if 4-inch prisms are used. Aggregate will be rejected if test values exceed these limits.

D. Admixtures:

1. Air Content:
   a. 3 percent to 6 percent when tested in accordance with ASTM C231.
   b. 3 percent maximum for interior slabs where heavy-duty concrete floor finish is required or for slabs required to be trowel finished. No air entraining admixture shall be added to mix.
2. Fly Ash: Maximum 25 percent, minimum 15 percent of total weight of cement plus fly ash.
3. GGBFS: Maximum 30 percent, minimum 15 percent of total weight of cement plus GGBFS.
4. Silica Fume: Maximum 10 percent of total weight of cement plus silica fume.
5. Total Combination of Fly Ash, Silica Fume, and GGBFS: Maximum 50 percent of total weight of cement plus fly ash, silica fume, and GGBFS. Fly ash or other pozzolans and silica fume shall constitute no more than 25 and 10 percent, respectively, of the total weight of the cementitious materials.
6. Total Combination of Fly Ash or other pozzolans and Silica Fume: Maximum 35 percent of total weight of cement plus fly ash and silica fume. Fly ash or other pozzolans and silica fume shall constitute no more than 25 and 10 percent, respectively, of the total weight of the cementitious materials.
7. Water Reducers: Use in all concrete.
8. High Range Water Reducers (Superplastizicers): Use in concrete with compressive strength of 4,000 psi or greater. Control slump and workability to at least 4-1/2-inch slump at discharge into forms by adjusting high range water reducer at batch plant.

E. Slump Range at Site:

1. 4-1/2 inches minimum, 8 inches maximum for concrete with a high range water reducing admixture.
2. 3 inches minimum and 6 inches maximum for concrete without high range water reducing admixture.

F. Combined Aggregate Gradation:

1. Combined Gradation Limits: Fine aggregate shall be in the range of 36 to 40 percent of total aggregate weight.

G. Chloride Content: Per ACI 301 except the maximum water soluble chloride ion (Cl-) content in concrete used in the Transfer Station shall not exceed 0.15 percent by weight of cement, and 0.30 percent in concrete used elsewhere.

2.05 CONCRETE MIXING

A. General: In accordance with ACI 301.

B. Concrete Mix Temperatures: As shown below for various stages of mixing and placing:

Concrete Temperatures				
	Concrete Member Size, Minimum Dimension			
Ambient Air Temp.	**<12"**	**12"-36"**	**36"-72"**	**>72"**
Minimum concrete temperature as mixed for indicated air temperature:				
Above 30 deg F	60 deg F	55 deg F	50 deg F	45 deg F
0 to 30 deg F	65 deg F	60 deg F	55 deg F	50 deg F
Below 0 deg F	70 deg F	65 deg F	60 deg F	55 deg F
Maximum allowable gradual temperature drop in first 24 hours after curing period and after end of protection:				
–	50 deg F	40 deg F	30 deg F	20 deg F

C. Truck Mixers: For every truck, test slump of samples taken per 12.5.1 of ASTM C 94. Where specified slump is more than 4 inches, and if slump tests differ by more than 2 inches, discontinue use of truck mixer unless causing condition is corrected and satisfactory performance is verified by additional slump tests.

2.06 SOURCE QUALITY CONTROL

A. Cement: Test for total chloride content.

B. Fly Ash: Test in accordance with ASTM C311.

C. Batch Plant Inspection: Engineer shall have access to and have right to inspect batch plants, cement mills, and supply facilities of suppliers, manufacturers, and Subcontractors, providing products included in these Specifications.

1. Weighing Scales: Tested and certified within tolerances set forth in the NIST Handbook No. 44.
2. Batch Plant Equipment: Either semiautomatic or fully automatic in accordance with ASTM C94/C94M.

PART 3 EXECUTION

3.01 PLACING CONCRETE

A. Preparation: Meet requirements and recommendations of ACI 301, except as modified herein.

B. Inspection: Notify Engineer at least 1 full working day in advance before starting to place concrete.

C. Discharge Time: Maintain required slump throughout time of concrete placement and consolidation. Discontinue use of high range water reducing admixture (superplasticizers) and provide new mix design if it fails to maintain slump between 4 inches to 8 inches and produce good consolidation for length of time required. Redesign mix adjusting set control admixtures to maintain setting time in range required.

D. Placement into Formwork:

1. Before depositing concrete, remove debris from space to be occupied by concrete.
2. Prior to placement of concrete, dampen fill under slabs on ground, dampen sand where vapor retarder is specified, and dampen wood forms.
3. Reinforcement: Secure in position before placing concrete.
4. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep, except for slabs which shall be placed full depth. Place and consolidate successive layers prior to initial set of first layer to prevent cold joints.
5. Use placement devices, for example, chutes, pouring spouts, and pumps.
6. Vertical Free Fall Drop to Final Placement: 5 feet in forms 8 inches or less wide and 8 feet in forms wider than 8 inches, except as specified.
   a. For placements where drops are greater than specified, use placement device such that free fall below placement device conforms to required value.
   b. Limit free fall to prevent segregation caused by aggregates hitting reinforcing steel.
7. Do not use aluminum conveying devices.
8. Provide sufficient illumination in the interior of forms so concrete deposition is visible, permitting confirmation of consolidation quality.
9. Joints in Footings and Slabs:
   a. Ensure space beneath plastic water stop completely fills with concrete.
   b. During concrete placement, make visual inspection of entire water stop area.

c. Limit concrete placement to elevation of waterstop in first pass, vibrate concrete under waterstop, lift waterstop to confirm full consolidation without voids, place remaining concrete to full height of slab.
d. Apply procedure to full length of waterstops.

10. If reinforcement is in direct sunlight or is more than 20 degrees F higher in temperature than concrete temperature before placement, wet reinforcement with water fog spray before placing concrete to cool reinforcement.
11. Trowel and round off top exposed edges of walls with 1/4-inch radius steel edging tool.

E. Conveyor Belts and Chutes:

1. Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout conveying, hoisting, and placing system for concrete to pass without becoming segregated.
2. Do not use chutes longer than 50 feet.
3. Minimum Slopes of Chutes: Angled to allow concrete to readily flow without segregation.
4. Conveyor Belts:
   a. Approved by Engineer.
   b. Wipe clean with device that does not allow mortar to adhere to belt.
   c. Cover conveyor belts and chutes.

F. Retempering: Not permitted for concrete where cement has partially hydrated.

G. Pumping of Concrete:

1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to assure completion of concrete placement without cold joints in case of primary placing equipment breakdown.
2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
3. Replace pumping equipment and hoses (conduits) that are not functioning properly.

H. Maximum Size of Concrete Placements:

1. Limit size of each placement to allow for strength gain and volume change as a result of shrinkage.
2. Joints:
   a. Locate expansion, control, contraction, and construction joints where shown.

b. When expansion or control joints are not shown, provide construction joints at maximum spacing of 40 feet.
c. When expansion or control joint spacing exceeds 60 feet, provide intermediate construction joints at maximum spacing of 40 feet.
d. Uniformly space construction joints.
e. Vertical construction joint shall not be greater than 20 feet from wall corners or intersections.

3. Consider beams, girders, brackets, column capitals, and haunches as part of floor or roof system and place monolithically with floor or roof system.
4. Should placement sequence result in cold joint located below finished water surface, install waterstop in joint.

I. Minimum Time between Adjacent Placements:

1. Construction Joints: 7 days.
2. Control Joints: 6 days.
3. Expansion Joints/Contraction Joints: 1 day.
4. At least 2 hours shall elapse after depositing concrete in long columns and walls thicker than 8 inches before depositing concrete in beams, girders, or slabs supported thereon.
5. For columns and walls 10 feet in height or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

J. Removal of Water: Unless tremie method for placing concrete is specified, remove water from space to be occupied by concrete.

K. Consolidation and Visual Observation:

1. Consolidate concrete with internal vibrators with minimum frequency of 8,000 cycles per minute and amplitude as required to consolidate concrete in section being placed.
2. Provide at least one standby vibrator in operable condition at placement Site prior to placing concrete.
3. Consolidation Equipment and Methods: ACI 309R.
4. Provide sufficient windows in forms or limit form height to allow for concrete placement through windows and for visual observation of concrete.
5. Vibration consolidation shall not exceed distance of 3 feet from point of placement.
6. Vibrate concrete in vicinity of joints to obtain impervious concrete.

L. Hot Weather:

1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 305R.
2. Placement frequency shall be such that lift lines will not be visible in exposed or architectural concrete finishes.
3. Maintain concrete temperature below 90 degrees F at time of placement, or furnish test data or provide other proof that admixtures and mix ingredients do not produce flash set plastic shrinkage, or cracking as a result of heat of hydration. Cool ingredients before mixing to maintain fresh concrete temperatures as specified or less.
4. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.
5. Prevent differential temperature between reinforcing steel and concrete.
6. Evaporation Retardant: As specified in Section 03370, Concrete Curing.

M. Cold Weather Placement:

1. Do not place concrete when ambient temperature is below 40 degrees F or approaching 40 degrees F and falling, without special protection as specified or approved by Engineer.
2. Do not place concrete against frozen earth or ice, or against forms and reinforcement with frost or ice present.
3. Provide heated enclosures when air temperatures are below 40 degrees F.
4. Maintain surface temperature of concrete above 40 degrees F and cure concrete as specified in Section 03370, Concrete Curing, for minimum of 7 days.
5. Provide maximum and minimum thermometers placed on concrete surfaces spaced throughout Work to allow monitoring of concrete surface temperatures representative of Work.
6. In accordance with ACI 306.1 and ACI 301.
7. External Heating Units:
   a. Vent heating units to atmosphere and do not locally heat or dry concrete. Where water cure is specified, maintain wet condition.
   b. Do not exhaust heater flue gases (causes concrete carbonation as a result of concentrated carbon dioxide) directly into enclosed area.
8. Maintain curing conditions as specified in Section 03300, Concrete Curing.

3.02 CONCRETE BONDING

A. Horizontal Construction Joints in Reinforced Concrete Walls:

1. Thoroughly clean and saturate surface of joint with water.
2. Limit slurry concrete placement to 2-inch maximum thickness, 1-inch minimum thickness.
3. Use positive measuring device such as bucket or other device that will contain only enough slurry concrete for depositing in visually measurable area of wall to ensure that portion of form receives appropriate amount of slurry concrete to satisfy placement thickness requirements.
4. Do not deposit slurry concrete from pump hoses or large concrete buckets, unless specified placement thickness can be maintained and verified through inspection windows close to joint.
5. Limit concrete placed immediately on top of slurry concrete to 12 inches thick. Thoroughly vibrate to mix concrete and slurry concrete together.

B. To Existing Concrete:

1. Thoroughly clean and mechanically roughen existing concrete surfaces to roughness profile of 1/4 inch.
2. Saturate surface with water for 24 hours prior to placing new concrete.

3.03 CONSTRUCTION JOINTS

A. As specified in Section 03100, Concrete Formwork.

3.04 REPAIRING CONCRETE

A. General:

1. Inject cracks that leak with crack repair epoxy as specified in Section 03740, Crack Repair Crack Injection.
2. Repair horizontal concrete surfaces using one of the materials specified in Section 03722, Horizontal Concrete Surfaces Repair Systems. Select system, submit for review, and obtain approval from Engineer prior to use.
3. Repair vertical and overhead concrete as specified in Section 03720, Vertical and Overhead Concrete Surfaces Repair Systems.
4. Develop repair techniques with material manufacturer on mockup panels prior to starting actual repair work and show how finish color will blend with adjacent surfaces. Obtain approval from Engineer.

5. Obtain quantities of repair material and manufacturer's detailed instructions for use to provide repair with finish to match adjacent surface or apply sufficient repair material adjacent to repair to blend finish appearance.
6. Repair of concrete shall provide structurally sound surface finish, uniform in appearance or upgrade finish by other means until acceptable to Engineer.

B. Tie Holes:

1. Fill with nonshrink grout as specified in Section 03600, Grouting.
2. Match color of adjacent concrete and demonstrate on mockup panels first.
3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

C. Alternate Form Ties; Through-Bolts:

1. Mechanically roughen entire interior surface of through hole. Epoxy coat roughened surface and drive elastic vinyl plug to half depth. Dry pack entire hole from both sides of plug with nonshrink grout, as specified in Section 03600, Grouting. Use only enough water to dry pack grout. Dry pack while epoxy is still tacky. If epoxy has dried, remove epoxy by mechanical means and reapply new epoxy.
2. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

D. Exposed Metal Objects:

1. Metal objects not intended to be exposed in as-built condition of structure including wire, nails, and bolts, shall be removed by chipping back concrete to depth of 1 inch and then cutting or removing metal object.
2. Repair area of chipped-out concrete per requirements of Section 03720, Vertical and Overhead Concrete Surfaces Repair Systems.

E. Blockouts at Pipes or Other Penetrations:

1. Install per details shown on Drawings or submit proposed blockouts for review.
2. Use nonshrink, nonmetallic grout, Category I or II as specified in Section 03600, Grout.

3.05 CONCRETE WALL FINISHES

A. Type W-1 (Ordinary Wall Finish):

1. Patch tie holes.
2. Knock off projections.
3. Patch defective areas.

B. Type W-2 (Smooth Wall Finish):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.

C. Type W-4 (Finish for Cementitious Coatings):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.
4. Leave surface ready for cementitious coating specified in Section 09820, Cementitious Coatings.

D. Type W-5 (Finish for Painting):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.
4. Leave surface ready for painting as specified in Section 09900, Painting and Protective Coatings.

E. Type W-7 (Smooth Rubbed Wall Finish):

1. Only water curing will be permitted on walls being rubbed.
2. Perform rubbing while green concrete can be physically worked and smoothed without adding other materials, if structurally possible, the day following placement. Finish no later than 3 days after placement has been completed.
3. Remove forms at such a rate that finishing, form tie filling, fin removal, and patching can be completed on same day forms are removed while curing wall.
4. After pointings have set sufficiently to permit working on surface, thoroughly saturate entire surface with water for period of 3 hours and rub until uniform surface is obtained.
5. Rub either by hand with carborundum stone of medium-coarse grade or abrasive of equal quality, or mechanically operated carborundum stone.

6. Mechanically operated carborundum stones shall be approved by Engineer before concrete finishing.
7. No cement grout, other than cement paste drawn from the concrete itself by the rubbing process shall be used.
8. Finish paste formed by rubbing by either brushing or floating as follows:
   a. Brushing:
      1) Carefully strike with clean brush.
      2) Brush in long direction of surface being finished.
   b. Floating:
      1) Spread uniformly over surface and allow to reset.
      2) Finish by floating with canvas, carpet face, or cork float, or rub down with dry burlap.
9. Continue water curing of wall during finishing operation in areas not being rubbed.
10. Move water curing onto rubbed areas as soon as water will not erode rubbed surface

F. Type W-8 (Rubbed Wall Finish):

1. Meet requirements for Type W-7, except allow paste obtained from rubbing to set at least 24 hours.
2. After thoroughly saturating with water, coat surface with mixture of 85 percent cement and 15 percent lime with sufficient water to give creamy consistency. Demonstrate on sample panel prior to production finishing.
3. Rub this mixture into surface with coarse carborundum stone and brush with damp brush.
4. Brush in long direction of surface being finished.
5. Latex bonding admixture may be used. Consult with Euclid Chemical Co., Cleveland, OH or BASF Building Systems Inc., Shakopee, MN.

G. Type W-9 (Grout Cleaned Finish):

1. Meet requirements for Type W-7, except that finish must be accomplished within 7 days of placement.
2. Grout: Mixed with 1 part portland cement and 1-1/2 parts fine sand and bonding agent to produce grout with consistency of thick paint. White portland cement shall be substituted for part of gray portland cement in order to produce color matching color of surrounding concrete, as determined by trial patch.
3. Wet surface of concrete sufficiently to prevent absorption of water from grout and apply grout uniformly with brushes or spray gun.

4. Immediately after applying grout, scrub surface vigorously with cork float or stone to coat surface and fill air bubbles and holes.
5. While grout is still plastic, remove excess grout by working surface with rubber float, burlap, or other means. After surface whitens from drying (about 30 minutes at 70 degrees F), rub vigorously with clean burlap. Continue to water cure wall until curing period of 7 days is complete.
6. Latex bonding admixture may be used.

H. Type W-10 (Fractured Fin Finish):

1. Form exterior surface of walls with approved form liner.
2. Use stainless steel form ties and place at valleys.
3. Patch form tie holes.
4. Achieve final texture by light sandblast and then breaking off tips of ridge with light bushhammering, or other approved process.
5. Same person starting bushhammering shall complete process for any given structure and match approved mockup panel.

I. Type W-11 (Abrasive Blast - Sandblast Finish):

1. Intent of this procedure is to remove surface skin to depth no more than 1/16 inch, and expose only fine aggregate and air holes near surface, thus producing uniform texture.
2. Perform sandblasting on building or on concrete surfaces in same area of view at same time and obtain uniformity of appearance.
3. Same person shall accomplish sandblasting on one structure and on concrete in same area.
4. Perform sandblasting to match approved mockup panel.
5. Abrasive: Use clean silica sand, free of foreign materials, and supplied in sealed sacks.
6. Blast surface with 100 psi air pressure at rate of 2 square feet to 3 square feet per minute with nozzle held approximately 2 feet from surface and perpendicular thereto.

3.06 CONCRETE SLAB FINISHES

A. General:

1. Finish slab concrete per the requirements of ACI 302.1R.
2. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
3. Do not use "jitterbugs" or other special tools designed for purpose of forcing coarse aggregate away from surface and allowing layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.

4. Do not dust surfaces with dry materials.
5. Use evaporation retardant.
6. Round off edges of slabs with steel edging tool, except where cove finish is shown. Steel edging tool radius shall be 1/4 inch for slabs subject to wheeled traffic.

B. Type S-1 (Steel Troweled Finish):

1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
3. Use sufficient pressure on wood floats to bring moisture to surface.
4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
5. Burnish surface with an additional troweling. Final troweling shall produce ringing sound from trowel.
6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
7. Power Finishing:
   a. Approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
   b. Do not use power machine when concrete has not attained necessary set to allow finishing without introducing high and low spots in slab.
   c. Do first steel troweling for slab S-1 finish by hand.

C. Type S-2 (Wood Float Finish):

1. Finish slab to receive fill and mortar setting bed by screeding with straightedges to bring surface to required finish plane.
2. Wood float finish to compact and seal surface.
3. Remove laitance and leave surface clean.
4. Coordinate with other finish procedures.

D. Type S-3 (Underside Elevated Slab Finish): When forming is removed, grind off projections on underside of slab and patch defective areas, including small shallow air pockets where schedule of concrete finishes requires:

1. Prepare surfaces for cementitious coating as specified in Section 09820, Cementitious Coatings.

E. Type S-4 (Exposed Aggregate Finish):

1. Embed single layer of selected aggregates at surface of concrete slab immediately after it has been placed, screeded, and smoothed.
2. Embed aggregates by tamping with wood float, darby, or rolling device.
3. Accomplish exposure of selected aggregates by removing surface matrix by washing with water and brushing with stiff plastic bristled brush as soon as concrete has set sufficiently to support weight of a person.
4. Exposure: No greater than 1/3 the average diameter of aggregate, nor less than 1/4.
5. Next day acid wash until there is no noticeable cement film on aggregate exposed.
6. Apply clear sealer per manufacturer's recommendations.

F. Type S-5 (Broomed Finish):

1. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing fine-hair broom lightly across surface.
2. Broom in same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab, broom surface in radial direction.

G. Type S-6 (Sidewalk Finish):

1. Slope walks down 1/4 inch per foot away from structures, unless otherwise shown.
2. Strike off surface by means of strike board and float with wood or cork float to true plane, then flat steel trowel before brooming.
3. Broom surface at right angles to direction of traffic or as shown.
4. Lay out sidewalk surfaces in blocks, as shown or as directed by Engineer, with grooving tool.

H. Concrete Curbs:

1. Float top surface of curb smooth, and finish all discontinuous edges with steel edger.
2. After concrete has taken its initial set, remove front form and give exposed vertical surface an ordinary wall finish, Type W-1.

3.07 CONCRETE SLAB TOLERANCES

A. Slab Tolerances:

1. Exposed Slab Surfaces: Comprise of flat planes as required within tolerances specified.

2. Slab Finish Tolerances and Slope Tolerances: Crowns on floor surface not too high as to prevent 10-foot straightedge from resting on end blocks, nor low spots that allow block of twice the tolerance in thickness to pass under supported 10-foot straightedge.
3. Slab Type S-A: Steel gauge block 5/16 inch thick.
4. Slab Type S-B: Steel gauge block 1/8 inch thick.
5. Slab Type S-A and S-B: Finish Slab Elevation: Slope slabs to floor drain and gutter, and shall adequately drain regardless of tolerances.
6. Thickness: Maximum 1/4 inch minus or 1/2 inch plus from thickness shown. Where thickness tolerance will not affect slope, drainage, or slab elevation, thickness tolerance may exceed 1/2 inch plus.

3.08 BEAM AND COLUMN FINISHES

A. General: Inject cracks with crack repair epoxy as specified in Section 03740, Concrete Repair Crack Injection. Patch and repair defective areas.

B. Type B-1: Match wall Type W-1.

C. Type B-2: Match wall Type W-2.

D. Type B-3:

1. Repair rock pockets.
2. Fill air voids.
3. Match wall Type W-3.

E. Type C-1: Match wall Type W-1.

F. Type C-2: Match wall Type W-2.

G. Type C-3:

1. Fill air pockets.
2. Match wall Type W-3.

3.09 BACKFILL AGAINST WALLS

A. Do not backfill against walls until concrete has obtained specified 28-day compressive strength.

B. Place backfill simultaneously on both sides of wall, where required, to prevent differential pressures.

3.10 FIELD QUALITY CONTROL

A. General:

1. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
2. Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, Samples used shall be taken from discharge end of pump hose.
3. Evaluation will be in accordance with ACI 301 and Specifications.
4. Specimens shall be made, cured, and tested in accordance with ASTM C31/C31M and ASTM C39/C39M.
5. Frequency of testing may be changed at discretion of Engineer.
6. Pumped Concrete: Take concrete samples for slump (ASTM C143/C143M) and test cylinders (ASTM C31/C31M and ASTM C39/C39M) and shrinkage specimens (ASTM C157/C157M) at placement (discharge) end of line.
7. Reject concrete represented by cylinders failing to meet strength and air content specified.

B. Drying Shrinkage Tests:

1. Perform on concrete for laboratory trial mixes every 5,000 cubic yards of concrete used on job and every 3 months during construction when compression test cylinders are made.
2. Make set of three specimens for each shrinkage test.
3. Prism Specimen Size:
   a. 4 inches by 4 inches by approximately 11 inches with effective gauge length of 10 inches for all aggregate that passes 2-inch sieve.
   b. 3 inches by 3 inches by approximately 11 inches with effective gauge length of 10 inches for all aggregate that passes 1-inch sieve.
4. Specimens: Fabricate, cure, dry, and measure as specified in ASTM C157/C157M modified as follows:
   a. Remove specimens from molds aged 23 hours, plus or minus 1 hour after trial batching.
   b. Place immediately in water at 73 degrees F, plus or minus 3 degrees for at least 30 minutes.
   c. Measure within 30 minutes thereafter to determine original length and then submerge in saturated limewater at 73 degrees F, plus or minus 3 degrees.
   d. Measure at age 7 days to determine expansion expressed as percentage of original length. Length at age 7 days shall be base length for drying shrinkage calculations (0 day drying age).

e. Store specimens immediately in humidity control room maintained at 73 degrees F, plus or minus 3 degrees and 50 percent, plus or minus 4 percent relative humidity for remainder of test.
f. Measure to determine shrinkage expressed as percentage of base length and report separately for 7 days, 14 days, 21 days, and 28 days of drying after 7 days of moist curing.

5. Computing Drying Shrinkage Deformation:
   a. Deformation of Each Specimen: Difference between base length (at 0-day drying age) and length after drying at each test age.
   b. Compute average drying shrinkage deformation to nearest 0.001 percent at each test age.
   c. If drying shrinkage of any specimen departs from average of that test age by more than 0.004 percent, disregard results obtained from that specimen.
6. Compression Test Specimens:
   a. Take in each case from same concrete used for preparing drying shrinkage specimens, and fabricate, cure, and test in accordance with ASTM C192/C192M.
   b. Onsite, at point of discharge of concrete placement, take test cylinders from concrete with slump equal to that specified for Project.
   c. Test three specimens at age of 7 days and four at age of 28 days.
   d. These tests shall be considered part of normal compression tests for Project.
   e. Results at end of 28-day drying period shall not exceed 0.045 percent if 3-inch prisms are used, or exceed 0.042 percent if 4-inch prisms are used for both laboratory trial mixes and for field specimens during construction.
7. If 7-day or 14-day shrinkage specimen tests for placed concrete exceed shrinkage limits established from acceptable test batch shrinkage tests, furnish additional 14 days of water curing beyond that specified for concrete surfaces of hydraulic structures that drying shrinkage specimens represent. Modify mix design to reduce shrinkage prior to casting additional concrete on Project.

C. High Range Water Reducer (Superplasticizer) Admixture Segregation Test: Test each truck prior to use on job.

1. Segregation Test Objective: Concrete with 4-inch to 8-inch slump must stay together when slumped. Segregation is assumed to cause mortar to flow out of mix even though aggregate may stay piled enough to meet slump test.
2. Test Procedure: Make slump test and check for excessive slump and observe to see if mortar or moisture flows from slumped concrete.
3. Reject concrete if mortar or moisture separates and flows out of mix.

D. Cold Weather Placement Tests:

1. During cold weather concreting, cast cylinders for field curing as follows. Use method that will produce greater number of specimens:
   a. Six extra test cylinders from last 100 cubic yards of concrete.
   b. Minimum three specimens for each 2 hours of placing time or for each 100 cubic yards.
2. These specimens shall be in addition to those cast for lab testing.
3. Protect test cylinders from weather until they can be placed under same protection provided for concrete of structure that they represent.
4. Keep field test cylinders in same protective environment as parts of structure they represent to determine if specified strength has been obtained.
5. Test cylinders in accordance with applicable sections of ASTM C31/C31M and ASTM C39/C39M.
6. Use test results to determine specified strength gain prior to falsework removal or for prestressing.

E. Tolerances:

1. Walls: Measure and inspect walls for compliance with tolerances specified in Section 03100, Concrete Joint.
2. Slab Finish Tolerances and Slope Tolerances:
   a. Floor flatness measurements shall be made day after floor is finished and before shoring is removed to eliminate effects of shrinkage, curing, and deflection.
   b. Support 10-foot-long straightedge at each end with steel gauge blocks of thicknesses equal to specified tolerance.
   c. Compliance with designated limits in four of five consecutive measurements is satisfactory, unless defective conditions are observed.

3.11 MANUFACTURER'S SERVICES

A. Provide the following representative at Site in accordance with Section 01640, Manufacturers' Services, for installation assistance, inspection, and certification of proper installation for concrete ingredients, mix design, mixing, and placement.

1. Batch Plant Representative:
   a. Observe how concrete mixes are performing.
   b. Be present during first placement of each type of concrete mix.
   c. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project.
   d. Establish control limits on concrete mix designs.

2. Admixture Manufacturer's Representative:
   a. Demonstrate special features, product performance, product mixing, testing, and placement or installation for each type of admixture.
   b. Observe how concrete mixes are performing.
   c. Be present during first placement of each type of concrete mix.
   d. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project, including instructions for redosing.
   e. Provide equipment for control of concrete redosing for air entrainment or high range water reducing admixture (superplasticizers) at Site to maintain proper slump and air content if so needed.
3. Bonding Agent Manufacturer's Representative: Demonstrate product performance, product mixing, and placement.

3.12 PROTECTION OF INSTALLED WORK

A. After curing as specified in Section 03370, Concrete Curing, and after applying final floor finish, cover slabs with plywood or particle board or plastic sheeting or other material to keep floor clean and protect it from material and damage as a result of other construction work.

B. Repair defective areas and areas damaged by construction.

3.13 SCHEDULE OF CONCRETE FINISHES

A. Form Tolerances: As specified in Section 03100, Concrete Formwork.

B. Special Floor Finishes: As specified in Section 03355, Concrete Flooring Finishes.

C. Provide concrete finishes as scheduled:

Area	Type of Finish	Required Form Tolerances
Exterior Wall Surfaces		
Abovegrade/exposed (above a point 6" below finish grade)	W-4	W-B
Abovegrade/covered with brick veneer or other finish material	W-1	W-A
Backfilled/waterproofed (below a point 6" below finish grade)	W-1	W-A

Area	Type of Finish	Required Form Tolerances
Backfilled/not waterproofed (below a point 6" below final grade)	W-1	W-A
Walls to receive cementitious coatings	W-1	W-A
Interior Wall Surfaces		
Unless noted otherwise/not painted or coated	W-2	W-A
Unless noted otherwise/painted or coated	W-5	W-A
Exterior Slabs		
Roof slab/exposed	S-5	S-B
Roof slab/covered with roofing material	S-1	S-A
Top of wall	S-1	S-B
Stairs and landings	S-5	S-B
Sidewalks	S-6	S-B
Other exterior slabs	S-1	S-A
Interior Slabs		
Unless noted otherwise	S-1	S-B
Slabs to receive mortar setting bed for tile	S-2	S-A
Slabs to receive resilient flooring or carpet	S-1	S-B
Underside of elevated slabs	S-3	S-A
Beams and Columns		
Beams/coated	B-3	B-A
Beams/not coated	B-2	B-A
Columns/coated	C-3	C-A
Columns/not coated	C-2	C-A

END OF SECTION

SECTION 11150
KNUCKLEBOOM CRANE

PART 1 GENERAL

1.01 WORK INCLUDED

A. This Section covers the Work necessary to furnish and install, complete and ready for operation, the knuckleboom crane as specified herein and as shown on the Drawings. Locate the hydraulic and power units remotely from the knuckleboom crane in the location shown on the Drawings. Mount controls in the Operator's Booth, a as indicated on the Drawings.

1.02 MANUFACTURER'S SERVICES

A. A manufacturer's representative for the equipment specified shall be present at the jobsite for a minimum of 2 days for installation assistance, certification of the installation, range-of-motion adjustment, startup assistance, and training of Owner's personnel. Travel time shall not be included in the 2 days at the jobsite.

B. Manufacturer shall factory test each knuckleboom crane for a minimum of 4 hours prior to shipping. Manufacturer shall provide documentation that the crane have a lift capacity rating of 21,500 pounds, and a push capacity rating of 20,000 pounds, at 8 feet from the center of the crane's base. Knuckleboom crane shall be set to operate with a minimum net lift capacity of 16,000 pounds at 8 feet from the center of the crane's base, and provide a compaction/downward force (at full extension) of 5,000 pounds, minimum, when shipped from the factory. Manufacturer shall notify Owner a minimum of 10 days prior to factory test and allow Owner or Engineer representative to witness the factory test.

C. Manufacturer shall adjust, or direct Contractor to adjust, the limit switches for crane rotation and grapple range-of-motion as required by Owner's operator.

D. Manufacturer's Maintenance Service:

1. The Knuckleboom Crane shall be covered by 5-Year Maintenance Services Agreements.
2. Maintenance Service Agreements shall commence at Substantial Completion for the Phase in which the equipment is included and shall include controls and other appurtenances provided by the manufacturer.

3. The manufacturer or the manufacturer's designated representative shall perform the maintenance services. The Contractor shall purchase the Maintenance Service Agreements in conjunction with the equipment purchase and shall transfer ownership of the Maintenance Service Agreements to the Owner at Substantial Completion. Term of the Maintenance Service Agreements shall begin at Substantial Completion.
4. Manufacturer's maintenance services shall include all routine and preventive maintenance services designated in the Manufacturer's Operations and Maintenance Manual at frequencies greater than monthly. Daily, weekly and monthly routine and preventive maintenance services will be performed by the Owner. The cost of all parts, labor, and materials necessary to perform the Manufacturer's maintenance services shall be covered by the Maintenance Service Agreement. Repairs necessitated by improper operation or damage from external sources shall not be covered by the Maintenance Service Agreement.
5. The Service Agreement shall be signed and notarized by a principal of the crane manufacturer and original copies shall be included in each copy of the O&M Manual.
6. Execution of Maintenance Service Agreement shall be guaranteed through a Performance Bond acceptable to the Owner.

1.03 SUBMITTALS

A. Submittals shall be made as required in Division 1, General Requirements. In addition, the following specific information shall be provided:

1. Furnish complete, detailed fabrication and construction drawings for the knuckleboom crane and all accessory items. Additionally, provide manufacturer's brochures for the new crane and associated equipment.
2. Plan, section, and detail drawings of the crane showing the minimum clearance between the crane and surrounding structures within the operating swing radius of the crane.
3. Installation instructions.
4. Test procedures to document loads in Article Manufacturer's Services.
5. Recommended list of renewable spare parts for first 2 years of operations.

B. Operation and Maintenance manual including Warranty Agreement as required by Paragraph 1.04.

C. Manufacturer's Certificate of Proper Installation.

1.04 WARRANTIES

A. The crane manufacturer shall provide a 5-year full parts and labor warranty for the crane including motors, hydraulic pumps and lines, control units and any other items provided by the crane manufacturer. The warranty period shall commence on the date of final completion and acceptance by the Owner and end 60 months after the date of final completion of construction. This date will be different than date of shipment, installation, and possibly different than the date of successful testing. See Division 1, General Requirements for facility testing requirements as well as the definition of the date of final completion.

PART 2 PRODUCTS

2.01 KNUCKLEBOOM CRANE

A. Knuckleboom crane shall be electrically powered and complete with frame, boom, base and anchor bolts, grapple, electric motor, hydraulic system, and remotely located controls (no cab), together with all accessories normally required for proper installation and operation.

B. Cable-less knuckleboom crane shall be Grizzly Model 215SW as manufactured by Crane Equipment Manufacturing Corporation, Eugene, OR (541/746-9681). Furnish and install crane as shown on the Drawings.

C. Knuckleboom crane shall fit in the space provided and all portions of the crane shall have adequate clearance from the surrounding concrete structure, as recommended by the manufacturer. Contractor shall confirm clearances throughout operating swing radius of the crane.

D. Knuckleboom crane shall be a cable-less model with all controls located in the centrally located Operator's Booth.

E. The knuckleboom crane shall possess the following minimum design features and capabilities:

1. Frame and base shall be designed and fabricated with steel reinforcement to withstand the maximum stress normally imposed in heavy-duty solid waste crane operations.
2. Crane swing system shall be capable of 360-degree rotation, noncontinuous. Furnish electric-hydro swing-stop option so that swing can be limited to less than 360 degrees as required for operations.
3. Minimum Cylinder Requirements: 7 inches by 37.5 inches main cylinder, with 3-inch diameter rod, and 6 inches by 36 inches with 3 inches diameter rod, jib cylinder.

4. Hydraulic System Minimum: 2,000 psi operating pressure with a triple hydraulic pump, 20/20/15 gpm. System shall have minimum 2 return-line filters and 3 suction filters, fluid level and low level shut-off gauges, and a 125 gallon capacity hydraulic tank.
5. Crane to be configured with a straight articulating boom possessing a minimum reach length of 25 feet with below-floor-level reach of 13 feet. Boom to be heavy-duty, all-welded steel construction, with replaceable bushings.
6. Furnish boom with a solid waste type grapple with wristing cylinder and compaction plate, of all-welded steel construction and designed specifically for picking and compacting domestic refuse. The minimum-volume capacity of the grapple shall be 1/3 cubic yard. Hoses and fittings shall be extra heavy duty rated, and be protected from snagging and breaking.
7. Driven by a minimum of 50 horsepower, mill-and-chemical-type TEFC motor. Motor shall be rated at 460 volts, 3-phase, 60-Hz. Knuckleboom crane shall include an electronic reduced voltage motor starter with a main circuit breaker. Motor locked rotor kVA shall not exceed 6.3 kVA per horsepower (NEMA MG-1 locked rotor kVA Code Letter G).
8. Crane boom and grapple shall be actuated by double-acting hydraulic cylinders with chrome-plated piston rods. The hydraulic pump shall be capable of providing power simultaneously, without reducing power, to more than two crane functions. Provide ample hydraulic circuit and reservoir capacity for sustained operation cycles without overheating.
9. Provide hydraulic system with site level gauge, internal replaceable filters, filters readily accessible for removal and replacement, and filters on supply and return lines.
10. Provide supports and/or encasements for hydraulic lines to protect lines from damage between the connections to the cylinders and the remote-located hydraulic system.
11. Controls shall provide for "raise," "hold," "lower," "swing," and the necessary grapple function controls. Controls shall be dual joysticks with extra handle and foot pedal, and conveniently located for ease of Operator operation. Provide crane controls with direct linkage to the main valve, with one handle to raise/lower main and swing, and another handle to operate jib and wristing. Secondary handles shall open/close grapple and orbit grapple.
12. Furnish crane integrally mounted to minimum 5-foot square by 1-inch thick steel base plate with 1-inch thick shock-absorbing pad, with pre-drilled holes for anchor bolts.
13. Crane manufacturer shall provide knuckleboom crane anchor bolts, nuts, and washers for installation of the crane. Diameter shall be as required by the manufacturer and fasteners shall be high strength and corrosion resistant as required. Crane anchor bolts shall be precisely located as detailed on the Drawings.

14. Paint exposed ferrous metal surfaces of the crane and related items with manufacturer's premium grade coating system suitable for long term service in a coastal marine service environment. Minimum 3 mils primer coat and two coats of intermediate and top coating for a total mid and top coating dry film thickness of 6 mils, minimum.
15. All electric components, including conduits and boxes, shall conform to the requirements of Division 16, Electrical.
16. Furnish with oversized electrical and hydraulic components as necessary for remote location of the power unit and controls, in the locations shown on the Drawings.
17. Furnish hydraulic oil and all other components necessary to operate the machine.

F. Remote Power Unit:

1. Provide hydraulic lines, concrete penetrations, and hangers for routing of the hydraulic lines from the crane location to the power unit location.
2. Follow all manufacturer's recommendations for materials, but as a minimum provide the following:
   a. Hydraulic line shall be minimum Schedule 40 ASTM A53 Grade A, ungalvanized, and sized to produce minimal head loss for the length of the pipe run.
   b. Clamps shall be used to support all piping and minimize vibration. Spacing shall be minimum as specified by manufacturer.
   c. Clamping system shall have high heat resistance, shall be rated for highly corrosive environments, and shall be cushioned to absorb vibrations.
   d. Provide adequately sized concrete penetrations for penetration of hydraulic lines through concrete as necessary to route the hydraulic lines from the crane to the power packs. Follow requirements in Section 03300, Cast-In-Place Concrete.

G. When recommended by the manufacturer, change or modify hydraulic pumps in the power unit and/or make any other modifications necessary to the power unit or its connections to the main hydraulic cylinder because of the remote location of the power units relative to the crane.

H. Provide all mounting hardware necessary to mount the power units in the locations shown on the Drawings, in accordance with the manufacturer's recommendations.

I. Provide all electrical components necessary to connect the power units to the power supply and to the crane. Follow all requirements of Division 16, Electrical.

J. Provide manufacturer's recommended spare parts for first 2 years of operations.

K. Provide four copies of the service manual for the crane and all associated components, with detailed instructions for maintenance and repair of all electrical, mechanical, and other components. Manual shall include detailed as-built drawings of mechanical and all other machine components and detailed electrical schematics and information. Provide detailed catalog information and service manuals for all items that are not manufactured by the crane company. Provide periodic maintenance schedules and procedures for all maintenance and routine repair of crane components.

L. Crane shall be constructed to comply with all local, State of Florida, and Federal safety requirements.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall install the knuckleboom crane, power unit, and all associated electrical, mechanical, and hydraulic equipment in accordance with the manufacturer's instructions.

B. Crane anchor bolts shall be cast in-place. Carefully coordinate bolt pattern and anchor bolt requirements with manufacturer.

C. Mount the power units in the locations as shown on the Drawings in accordance with the manufacturer's recommendations. Install anchor bolts and grout and/or equipment pads according to manufacturer's recommendations.

D. Install all electrical components necessary to connect the power units to the power supply and to the crane. Follow all requirements of Division 16, Electrical.

E. Install hydraulic lines, concrete penetrations, and hydraulic line clamps. Route the hydraulic lines as shown on the Drawings and as directed by the Engineer to minimize interference with other equipment and operations. Minimize the number of bends in the hydraulic lines. Install all fittings, clamps, and space the clamps according to manufacturer's recommendations.

3.02 OPERATOR INSTRUCTION

A. Following installation by the Contractor, a manufacturer's representative shall instruct the Owner's personnel in proper operation of the equipment. A minimum of one of the 2 days the manufacturer's representative is onsite shall be dedicated to training of Owner's personnel.

B. After 30 days of operation, or as recommended by the Owner, manufacturer's representative shall inspect the crane equipment and check all operating systems for proper operation and adjustment. Manufacturer shall make changes as necessary to bring the installation within manufacturer's recommended operating parameters and shall provide all materials, labor, and equipment necessary to make adjustments and fix any leaks or mechanical problems.

3.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials in manufacturer's original, unopened, undamaged containers.

B. Handle materials in such a manner as to prevent damage to products or finishes.

END OF SECTION

SECTION 13110
TRUCK SCALES AND ACCESSORIES

PART 1 SCOPE OF WORK

1.01 GENERAL

A. Provide five motor truck scales and appurtenances as shown on Drawings and specified herein. Scale supplier shall provide all labor, materials, tools, services and all incidentals necessary to provide complete, certified, and operational weighing systems.

B. Complete the scale foundation and approach design. The scale foundations shall be designed by a Florida Registered Professional Engineer specifically for Citrus County Solid Waste Transfer Station based on the Site conditions and requirements of the scale manufacturer. Geotechnical data for the proposed location of the scales is provided in the Drawings to assist the structural engineer in his design of the scale concrete foundation.

C. Extended Warranty and Service Contract: The scale manufacturer shall include the cost in his bid for providing a 5-year full parts and labor warranty coverage as part of this construction for all repairs and periodic maintenance of the scales and all electronic instrumentation, remote displays and pneumatic tube delivery systems without any charge for parts and labor to the Owner.

D. Scale vendor shall also obtain certification from State of Florida Department of Agriculture, Bureau of Weights and Measures, for each installed scale.

1.02 SUBMITTALS

A. Copies of all materials required to establish compliance with the Specifications shall be submitted in accordance of the General Conditions. Submittals shall include at least the following:

1. Shop Drawings:
   a. Descriptive literature, bulletins, and/or catalog cuts of the equipment.
   b. Complete bill of materials for all equipment provided. Include total weight of equipment and weight of the single largest piece.

c. Scale Fabrication and Erection Drawings: Include Drawings, elevations, and large-scale details, depicting truck scale, scale foundation and adjacent walls and ramp construction. Show anchorage and accessory items. Provide location and detailed Drawings for items supported and anchored to permanent construction. Provide Drawings for electrical and control requirements, and routing of all wiring and cable and conduits.

d. Design Calculations: Provide scale deck assembly design calculations signed and sealed by a professional engineer registered in the State of Florida.

B. Foundation and Approach Design: Signed and sealed foundation design calculations and Drawings.

C. Test Reports: Submit Certificate of Conformance reports showing compliance of truck scale and associated instruments with requirements of NTEP and current edition of National Institute of Standards and Technology Handbook 44, and the State of Florida requirements.

D. Operations and Maintenance Manual: Provide O&M (in accordance with Division 1, General Requirements sections including but not limited to all preventive maintenance schedules, Warranty Agreement as required by Paragraph 1.04, and service data including design drawings and dimensions, part numbers, and address and telephone number of nearest authorized service representative.

E. Certification documents from the State of Florida Department of Agriculture, Bureau of Weights and Measures, for each of the truck scales.

F. A list of manufacturers recommended spare parts with current price for each item.

1.03 QUALITY ASSURANCE

A. Single Source Responsibility: Provide truck scales as complete units produced by a single manufacturer, including necessary accessories, fittings and anchorage.

B. The truck weighing system manufacturer shall have experience for minimum of 10 years in manufacturing, installation and servicing of truck weighing equipment.

C. The scale shall be NTEP certified and shall meet the requirements as set fourth by National Institute of Standards and Technology Handbook 44, current edition for a Class IIIL weighing device. The manufacture shall provide a Certificate of Conformance to these standards.

D. Load cells shall be NTEP certified and shall meet the requirements as set fourth by National Institute of Standards and Technology Handbook 44, current edition for a Class IIIL device. The Manufacture shall provide a Certificate of Conformance to satisfy meeting these standards.

E. All welding shall be carried out in accordance with American Welding Society (AWS) D1.1 Structural Welding Code.

F. All structural steel members of the system shall be designed in accordance with the specifications of the American Institute of Steel Construction, current edition.

G. Control and power wiring shall comply with the applicable provisions of the National Electrical Code current edition. All control enclosures shall conform to NEMA standards.

1.04 WARRANTIES

A. The scale manufacturer shall provide a 5-year full part and labor warranty for the scales, the scale assembly including load cells, the digital weight indicator, junction boxes, and any other items provided by the scale manufacturer. The warranty period shall start on the date of final completion and acceptance by the Owner and end 60 months after the date of final completion of construction. This date will be different than date of shipment, installation, and possibly different than the date of successful testing. See Division 1, General Requirements for facility testing requirements as well as the definition of the date of final completion.

1.05 TOOLS AND SPARE PARTS

A. One set of all special tools required for normal operation and maintenance shall be provided.

B. The manufacturer of the equipment shall furnish a complete set of recommended spare parts necessary for first 5 years of operation of the systems.

C. Spare parts shall be properly bound and labeled for easy identification without opening the packaging and suitably protected for long term storage.

1.06 MANUFACTURER'S MAINTENANCE SERVICE

A. The scales and appurtenance provided by the scale manufacturer shall be covered by 5-Year Maintenance Services Agreements.

B. Maintenance Service Agreements shall commence at Substantial Completion for the Phase in which the equipment is included and shall include controls and other appurtenances provided by the manufacturer.

C. The manufacturer or the manufacturer's designated representative shall perform the maintenance services. The Contractor shall purchase the Maintenance Service Agreements in conjunction with the equipment purchase and shall transfer ownership of the Maintenance Service Agreements to the County at Substantial Completion. Term of the Maintenance Service Agreements shall begin at Substantial Completion.

D. Manufacturer's maintenance services shall include all routine and preventive maintenance services designated in the Manufacturer's Operations and Maintenance Manual. The cost of all parts, labor, and materials necessary to perform the maintenance service shall be covered by the Maintenance Service Agreement. Repairs necessitated by improper operation or damage from external source shall not be covered by the Maintenance Service Agreement.

E. The Service Agreement shall be signed and notarized by a principal of the crane manufacturer and original copies shall be included in each copy of the O&M Manual.

F. Execution of Maintenance Service Agreement shall be guaranteed through a Performance Bond acceptable to the County.

PART 2 PRODUCTS

2.01 TRUCK SCALES

A. Scales:

1. Transfer Station Tunnel 1 Scale (M-10-1-1).
2. Inbound Scales at Scale House (M-30-1-1 and M-30-1-2).
3. Outbound Scales at Scale House (M-30-2-1 and M-30-2-2).

B. Acceptable Manufactures:

1. Mettler-Toledo DigiTOL 7562 Truckmate.
2. B-TEK Centurian.
3. Cardinal EPR 13750.
4. Fairbanks HV or HVX.
5. Approved equal. Owner reserves the right to be the sole judge of determining the equality of an alternate scale and manufacturer.

C. Service Conditions:

1. The equipment for exterior installation including scales, scale components, instrumentation and all other related equipment shall be designed to operate in ambient weather conditions in Citrus County, Florida, including temperatures ranging from 15 degrees to 110 degrees Fahrenheit, intensive lightning levels, extreme rain and wind, relative humidity ranges from 15 percent to 100 percent, and dusty wet atmosphere. All critical parts of the scale system including junction boxes, load cells, mounting hardware, cables, cover bolts, and fasteners shall be constructed of stainless steel. Protection against power surges and failures shall be provided for all electronics including load cells and the weight indicator.
2. Scales are being installed at a solid waste transfer station. Scales and associated components will come into regular contact with municipal waste products and associated sticky/mildly corrosive liquid run-off. Scales shall operate as specified under these conditions.

D. General:

1. The scales shall be of concrete deck construction with clear and unobstructed weighing surface of not less than 11 feet wide and 70 feet long.
2. The scale shall have a nominal capacity of 200,000 pounds graduated in 20-pound increments and accurate up to 0.1 percent of actual weight measured across the length of the scale.
3. The scales shall be serviceable by any qualified scale service technician registered with the Florida Department of Weights and Measures.
4. Platform and weighing system shall be designed such that components will not be subject to damage due to normal incoming and outgoing truck movements.
5. The scale manufacturer shall provide all necessary components for a complete and functional weighing system.

E. Weighbridge:

1. The scale weighbridge shall have a duel tandem axle concentrated load capacity of not less than 80,000 pounds.
2. The weighbridges decking shall be 3/8-inch thick min checkered steel plate.
3. The weighbridge shall be designed to allow easy access to the junction boxes, load cells and cables, baseplates, and all foundation anchor bolts.
4. The scale weighbridge shall incorporate no bolted connections between the load cells and weighbridge.

5. All structural steel shall be cleaned to a minimum SSPC-SP-6 specification prior to painting. The scale platforms shall be painted by the manufacturer in accordance with the manufacturer's standard anticorrosive paint system, but it shall be no less than two coats of primer of a minimum 3-mil DFT each, and two finish coats of no less than 3-mil DFT each. Any damage to the paint system during shipment and/or during installation shall be touched up prior to substantial completion. Field painting per Section 09900, Painting and Protective Coatings.
6. Design shall be orthotropic with no support beams extending past the scale deck vertically.
7. Scale shall incorporate integral 4-inch pipe rub-rails along both sides of the deck, the full length of the scales. Rub-rails shall integrate with (but not contact) the approach pad curbs at each end of the scales. The rub-rail height shall be high enough to be effective, yet not so high as to damage truck wheels/lugs. Rubber caps shall be installed at pipe ends.
8. Each scale shall be designed to function as a single weighing platform and shall be of flat-top design incorporating eight load cells.
9. The bottom design of the weighbridges shall be open and free draining.
10. The scale shall be designed for an overall height of the deck not to exceed 18 inches from grade.

F. Foundation:

1. The foundations and approach to the scales shall meet all local requirements and the minimum specifications as stated in this Section and other related sections.
2. The foundations and approach shall be as shown on the Drawings.
3. The minimum soil bearing required shall be 2,500 pounds per square foot (psf) for a variable footer, 1,500 psf for a beam slab, and 2,000 psf for mat. The buyer shall be responsible for determining whether or not the soil conditions are adequate.
4. The foundations shall extend the full length and width of the scale platform and extended to the points as shown on Drawings.
5. The foundations concrete surface shall be sloped to provide positive drainage away from the scale foundation towards the inlets as shown on the Drawings.
6. The foundations should be reinforced in all load-bearing areas. The reinforcing steel shall have a minimum of 60 ksi yield strength, deformed ASTM 615 grade, 60 minimum.

7. The foundations shall be designed as to include two 10-foot long level approaches per scale, one at each end of each scale as shown on the Drawings. The foundations shall also include two concrete approach inclines back to grade, one at each end of the scale, 25 feet long (minimum), along with 8-inch concrete curbs, concrete walls, and other constructions as shown on the Drawings. The approaches shall be minimum of 11.5 feet in width.
8. The foundations shall be poured and constructed of concrete with a minimum strength of 4,500 psf, 28-day cure, as specified in Section 03300, Cast-In-Concrete.
9. The dimension shown on the Drawings for the concrete approach to and from the scale platforms and the concrete curbing and walls shall be used for design and construction of the scale foundation and approaches.

G. Load Cells:

1. Load cells shall be compression column type and have no positive fixed mechanical connectors, such as bolts or links that are required in mounting load cell to the weighbridge or foundation base plates.
2. Load cells shall not require check rods or chain links for stabilization.
3. Load cells shall be corrosion and moisture resistance polished Type 304 stainless steel construction and be hermetically sealed at the strain gauge and cable entry area. Load cells to have a NEMA 6P rating. Accuracy class to be NTE IIIL, 10,000 divisions.
4. Load cells shall be certified by NTEP and meet the specifications as set forth by NIST H-44 for Class IIIL devices. The manufacturer upon request shall provide a Certificate of Conformance to these standards.
5. Load cells shall have a minimum capacity each of 100,000 pounds.
6. All cables shall have stainless steel sheathing for rodent protection.
7. Load cells shall have safe overload limit of at least 150 percent and ultimate overload of 300 percent of rated capacity.
8. Maximum deflection rating of 0.02 inch at rated capacity.
9. Load cells shall be digital with an integral microprocessor and analog to digital conversion function located within the load cell housing.
10. Load cells shall output only converted digital information to the scale indicator. Analog output of signals from the load cell is not acceptable.
11. The load cell shall contain integral Transient Voltage Suppressors (TVS) for all input and communication lines. Each TVS should contain self-resetting thermal breakers to protect the load cell components from voltage and current surges.
12. The load cell shall have a chromium nitride coating on all bearing surfaces to reduce load cell wear.

13. The load cell shall come equipped with a neoprene rubber boot to keep debris from contaminating the lower bearing surface.
14. The load cell shall have a positive lock quick connector integral to its housing for connecting and disconnecting the load cell interface cable at the load cell. The connector shall be of glass to metal pin type construction to maintain a hermetic seal.

H. Suspension System:

1. Scale suspension system shall restrict the weighbridge motion and protect the load cells from damage. All components in the suspension system shall be stainless steel, and all components must be field replaceable.
2. Restriction of weighbridge motion shall be accomplished by adjustable platform bumpers. Checking systems that require stay-rods or check-rods or any rigid apertures between the scale and the foundation shall not be acceptable.

I. Junction Boxes and Cables:

1. All junction boxes shall be NEMA 4X rated and constructed of stainless steel. Junction boxes shall be easily accessible for inspection and maintenance.
2. Load cell cables shall be hard wired into terminal blocks on the junction box circuit boards. Load cells and scale platform to scale indicator cables shall be stainless steel sheathed for environment and rodent protection.

J. Scale Indicator/Transmitter:

1. General:
   a. The scale indicator shall be NTEP approved and meet or exceed the specifications set forth by the National Institute of Standards and Technology Handbook 44, latest edition for Class IIIL devices. The scale instrument shall be UL/CSA listed.
   b. The scale indicator shall be capable of performing calibration, span, zero, and shift adjustments through software calculations through the front panel keys. There shall be no in-scale adjustment requirement for these functions.
   c. The scale indicator shall be capable of assigning each load cell with its own identification number and shall be capable of displaying the weight reading of each individual load cell through the indicator without disconnecting any of the load cells from the system.
   d. The scale indicator shall display an error code in the event of load cell failure. The error code shall identify the failed load cells and the cause of the failure.

e. The scale indicator shall have 1,000 weigh memories for open transactions and stored tare weights. The scale indicator shall be capable of storing the weight information by two methods; either automatically through a future bar code reader, card reader or other automatic means, or by the operator manually assigning a memory location to the weight.
f. The scale indicator shall have subtotal and total weight accumulations, and shall be capable of being programmed and calibrated in pounds, kilograms, short tons, and metric tons.
g. One scale indicator is to be provided per scale.
h. Scale indicator shall use English language prompts to lead through startup, calibration, and testing.
i. Scale indicator shall have a transmitter counter to automatically assign a sequence number to transactions.
j. Communication Ports: Ports as necessary to interface with scoreboard displays and owners computer network as shown on Drawings. Provide wireless communication devices as shown on Drawings to communicate with remote scoreboards.
k. Provide all scale indicators with Ethernet communications port.
l. Power Requirement: 120V ac.

2. Model: Mettler Toledo IND780 digital weight indicator.

2.02 SURGE SUPPRESSION

A. A comprehensive lightning protection system shall be provided with the scale.

1. The system shall not require complicated wiring or devices to provide this protection.
2. Major scale components including load cells, scale indicator, and printer shall be included in the lightning protection system.
3. Grounding of all scale components including load cells, scale indicator, printer, and accessories shall be to one common point. Multiple ground point systems are not acceptable.
4. An AC line surge protector shall conveniently plug into a common electrical outlet and have receptacles for the scale indicator, ticket printer, and other scale accessories.
5. Each AC line surge protector required shall have one isolated grounding, hospital grade duplex receptacles, and an internal 15 amps circuit breaker.
6. Verification of the lightning protection system performance shall be available in writing from a third party verification laboratory upon request.
7. The lightning protection system shall be a Mettler-Toledo, Inc. StrikeShield™ Lightning Protection System or equal.
8. Shall include an EP-2000A total power quality system.

2.03 HIGH VISIBILITY SCOREBOARDS

A. Provide scoreboards as shown on the Drawings

1. Scoreboards shall be 6 character LED display with 6-inch numbers.
2. Enclosure: IP56, Type 4, Aluminum alloy with polyester powder coating.
3. Power Requirement: 120 VAC, 60-Hz, single-phase.
4. Provide serial or wireless communication with Weight Transmitters as shown on drawings.
5. Serial Scoreboards:
   a. Tag Numbers: 10WI-1-1 and 10WI-1-2.
6. Wireless Scoreboards:
   a. Tag Numbers: 30WI-1-1, 30WI-1-2, 30WI-1-3, 30WI-2-1, and 30WI-2-2.
7. Mettler Toledo ADI410 or equal.

2.04 TRAFFIC CONTROLS

A. Provide traffic control lights, lane status indicators, and control stations as shown on the Drawings

B. Traffic Control Lights:

1. Provide 8-inch nominal LED traffic signal lights.
2. Lens: Colored impact and UV resistant polycarbonate or glass. Provide a separate light for each color. Provide colors as shown on Drawings and noted below:
   a. Transfer Station Tunnel: Stationary Red and Green.
   b. Scalehouse Lanes: Flashing Red and Stationary Green.
3. Power: 120 Vac.
4. Housing: Weatherproof powder coated aluminum with visor.
5. Tag Numbers: 10CL-1-1, 10CL-1-2, 10CL-1-3, 30CL-1-4, 30CL-1-5, 30CL-1-6, 30CL-2-3, 30CL-2-4.

C. Lane Status Indicators:

1. Provide 12-inch nominal LED lane status lights.
2. Lens: Clear or smoke tinted impact and UV resistant polycarbonate or glass.
3. Indication: Red "X" to indicate lane closure and Green "Arrow" to indicate lane open in a single light.
4. Power: 120 Vac.
5. Housing: Weatherproof powder coated aluminum with visor.
6. Tag Numbers: 30CL-1-1, 30CL-1-2, 30CL-1-3, 30CL-2-1, and 30CL-2-2.

D. Control Stations:

1. Provide control stations as shown on Drawings.
2. Coordinate exact installation location and type of control stations with Owner.
3. Provide control station mounted switches as shown on Drawings.
4. Consolets for workstation locations:
   a. Tag Numbers: 30CS-1-2, 30CS-1-3, 30CS-2-2, 30CS-1-4, 30CS-2-3.
   b. NEMA Type 12 construction, desk mountable.
   c. Size as required for number of switches installed.
   d. Provide 3-position selector switches to provide function shown on Drawings or equivalent function multi-pushbutton configuration.
   e. Provide easy to read machine printed labels showing the function of each switch.
5. Control Station pendant for Crane Operator Booth:
   a. Tag Numbers: 10CS-1.
   b. NEMA Type 4X construction, impact resistant.
   c. Size as required for number of switches installed.
   d. Provide 3-position selector switches to provide function shown on Drawings or equivalent function multi-pushbutton configuration.
   e. Provide easy to read machine printed labels showing the function of each switch.
   f. Mount all switches on pendant face.
6. Control Station for scalehouse lane status control:
   a. Tag Number: 30CS-1-1.
   b. Provide 3-position toggle switches to provide function shown on Drawings.
   c. Provide switch faceplate with easy to read machine printed labels showing the function of each switch.

PART 3 EXECUTION

3.01 GENERAL

A. The construction of concrete foundations and all approaches for the scales and installation of the scales including all electrical, mechanical, and incidental work shall be the responsibility of the scale manufacturer.

B. All site work, compactions, concrete work, mechanical, electrical work, and all other work by the scale manufacturer or scale manufacturer's contractor shall be in accordance with related Specifications as included in other Sections unless specifically stated in this Section.

3.02 TESTING

A. In accordance with State of Florida, Department of Agriculture, Bureau of Weights and Measures, and Division 1, General Requirements.

3.03 INSTALLATION

A. All equipment shall be installed in full accordance with the manufacturer's instructions and recommendations by mechanics fully skilled in the installation of such equipment.

B. The truck scale platform shall be installed so that elevations of all four corners of any platform do not vary more than 0.1 inch from the highest to the lowest corner. The difference in elevation between end panels and adjoining ground slabs shall not exceed 0.06 inch.

C. As shown on the Drawings, a 10-foot flat approach pad is required at both ends of each scale deck. The approach pads must be constructed flat and true.

D. The approach pads and ramps have integral 8-inch high curbs. The interface between the curbs and truck scale rub-rails shall be designed/installed such that there is no obstruction in the vehicle path while entering or exiting the scale.

3.04 INSPECTION AND TESTING

A. In accordance with State of Florida, Department of Agriculture, Bureau of Weights and Measures and Division 1, General Requirements Specifications.

B. The equipment manufacturer shall furnish the services of a competent and experienced representative who has complete knowledge of proper operation and maintenance of the equipment for a period of not less than 2 days in two separate visits to inspect the installed equipment, supervise the initial test run. The first visit will be for checking and inspecting the equipment after it is installed. The second visit will be to operate and supervise the initial field test.

C. Working under the direction of the manufacturer and in the presence of the Engineer, the Contractor shall perform field tests as follows:

1. Full load operating tests of the scale.
2. All labor for testing capacity of scales shall be furnished under this Section.
3. In the event the equipment fails to meet the above tests, the necessary changes shall be made and the equipment retested. If the equipment remains unable to meet the test requirements to the satisfaction of the Engineer, they shall be removed and replaced with satisfactory equipment at no additional expense to the Owner.

4. All defects recorded during the above field tests and all defects and failures occurring within the first 5 years of operation shall be corrected at no additional expense to the Owner.
5. After completion of testing manufacturer's representative shall provide a report with a summary of inspection and testing activities as well as statement that the equipment has been properly installed and tested in accordance with manufacturer's recommendation.

3.05 PERSONNEL TRAINING

A. An experienced, competent, and authorized representative of the scale manufacturer shall train the Owner's personnel in operating, maintaining, and repairing the equipment specified in this Section.

1. Scales: 1 day, 1 trip.

B. Training must be scheduled with the Owner at least 10 days in advance and must be completed prior to final acceptance.

END OF SECTION

SECTION 13850
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. Electronic Industries Association (EIA):
   a. RS232, Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange.
   b. RS485, Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems.
2. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).
   b. 71, Standard for the Installation, Maintenance, and Use of Signal Systems for Central Station Service.
   c. 72, Standard for the Installation, Maintenance, and Use of Protective Signaling Systems.
   d. 72E, Standard for Automatic Fire Detection.
   e. 72H, Guide for Testing Procedures for Local, Auxiliary, Remote Station, and Proprietary Protective Signaling Systems.
   f. 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.
   g. 101, Code for Safety to Life from Fire in Buildings and Structures.
3. Underwriters Laboratories, Inc. (UL):
   a. 217, Single and Multiple Station Smoke Detectors.
   b. 228, Door Closures-Holders With or Without Integral Smoke Detectors.
   c. 268, Smoke Detectors for Fire Protection Signaling Systems.
   d. 268A, Smoke Detectors for Duct Applications.
   e. 464, Audible Signal Appliances.
   f. 497B, Protectors for Data and Fire Alarm Circuits.
   g. 521, Heat Detectors for Fire Protective Signaling Systems.
   h. 539, Single and Multiple Station Heat Detectors.
   i. 864, Control Units for Fire Protection Signaling Systems.
   j. 1480, Speakers for Fire Protection Signaling Systems.
   k. 1481, Power Supply for Fire Protection Signaling Systems.
   l. 1604, Electrical Equipment for Use in Class I and Class II, Division 2, and Class III Hazardous (Classified) Locations.
   m. 1638, Visual Signaling Appliances.
   n. 1971, Signaling Devices for the Hearing Impaired.

1.02 SUBMITTALS

A. Action Submittals:

1. Descriptive product information.
2. Dimensional drawings.
3. Itemized bill of material.
4. Operating and programming information.
5. Control panel configuration and module data.
6. Schematic, wiring, and interconnection diagrams.
7. Alarm initiating, indicating, and supervisory device electrical data.
8. Annunciator configuration and module data.
9. Shop Drawings shall be signed and sealed by a professional engineer licensed in the State of Florida.

B. Informational Submittals:

1. Operation and Maintenance Data: As specified in Section 01430, Operation and Maintenance Data.
2. Factory test reports.
3. Description of system operation and sequence of operation during supervisory trouble and alarm conditions.
4. NFPA 72, Fire Alarm System Certification and Description Form: Submit to Owner and code-enforcement authorities.

1.03 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials, equipment, and accessories specified in this Section shall be products of:

1. Simplex Time Recorder Co.
2. Cerberus Pyrotronics.

3. Edwards.
4. Honeywell.

2.02 GENERAL

A. Equipment suitable for addressable fire alarm system with initiating device circuits and Style Y indicating appliance circuits.

B. Operating Conditions:

1. Altitude not greater than 100 feet above sea level.
2. Ambient Temperature: Maximum 40 degrees C.
3. Suitable for use under local seismic conditions and in compliance with the applicable codes.
4. Equipment shall be fully rated without derating for these conditions.

C. System shall be designed by professional engineer licensed in the State of Florida in accordance with NFPA 70, Article 760, 72, and 72E, UL 864 and 107G.

2.03 FIRE ALARM CONTROL PANELS

A. General:

1. Control panel circuit for 24V dc power limited initiating circuits per NFPA 70, Article 760.
2. Assembled panel UL 864 listed, Product Category UOJ2 as an integrated control system.
3. Internally Mounted Module With:
   a. Transformer with 120V ac input and 21.5V ac output.
   b. Solid state rectifier for 21.5V ac input and fuse protected, filtered, and regulated 26V dc no-load output.
   c. Solid state transfer switch, minimum 8 amp-hours.
   d. Standby batteries sized for system operating period of 8 hours of standby mode operation.
   e. Solid state battery charger.
   f. Over/under voltage monitor supervisory circuit.
   g. Light emitting diodes for status of normal power, battery trouble, and power supply module trouble.
   h. Alarm mode of 10 minutes after standby operation.
4. Local differentiating audible sound device for alarm, trouble, and supervisory conditions.
5. Full digital transmission protocol.
6. Addressable signal transmission protocol to be either digital pole/response protocol or proprietary communication protocol, with all analog sensing device signals digitally transmitted to control panel.

7. Form C output circuitry for remote municipal alarm.
8. MVO/gas discharge transient protection for power supply module.

B. Modular Programmable Control Panel:

1. Modular construction with solid state, microprocessor-based components, programmable central processor unit, back lighted display of primary control status and essential alarm operating conditions, and concealed maintenance purpose operators keypad.
2. Main control module consisting of operator's keyboard/keypad, local and remote communications and supervision capabilities, system control memory, and programming interface.
   a. Two-line, 80-alphanumerical liquid crystal display characters with:
      1) Lower case letters for soft key titles and user's prompts.
      2) Upper case letters for system status information.
      3) Visible cursor for entering data information.
      4) Displayable when cabinet door is open.
   b. Primary operators keypad with:
      1) Acknowledge keys and light emitting diodes for system alarm, supervisory service, and system trouble conditions.
      2) Power on light emitting diode.
      3) Alarm silence reset keys.
      4) Displayable when cabinet door is closed.
   c. Passcode protected action display keypad for:
      1) Circuit/device enable or disable.
      2) Control on/off.
      3) Test/status.
      4) Auto or manual.
      5) Activate/reset.
      6) Display historical logs/real time.
      7) Function/menu.
      8) Program.
      9) Delete.
      10) Displayable when cabinet door is open.
   d. Numerical entry and selection keypad, used in conjunction with action display keypad, to perform control function on system zones, initiating circuits, or auxiliary relays, and to gain access to system information.
      1) Displayable when cabinet door is closed.
   e. Programmable control keypad with five passcode keys, associated light emitting diodes, and identification labels for:
      1) Door holder bypass.
      2) Manual evacuation.
      3) HVAC disable.
      4) Displayable when door is open.

f. Four function keys for control of variable functions related to primary operations keypad, displayable when door is open.

3. EIA RS 485, NFPA 72, data circuit capability for remote annunciators.
4. Form C relay contacts rated 2 amperes, 24V dc.
5. Down loader port for connection to microprocessor-based transponder.
6. Power supply interface module generating digital voltage and current data to liquid crystal display with:
   a. dc power conversion and output terminals.
   b. Supervision and control of power supply.
7. In/out module with coded input on first alarm, local trouble light emitting diode, and in/out capabilities for:
   a. 127 addressable initiating alarm sensors consisting of analog/addressable or traditional detector methods.
   b. Four hardwired I/O points, field selectable in any combination to be either NFPA 72, Style B or D, initiating device circuits or NFPA 72, Style Y or Z, indicating appliance circuits or auxiliary control circuits.
   c. Auxiliary control circuit contacts shall be single-pole, double-throw rated 2 amperes at 24V dc and 0.5 amperes at 120V ac.
8. Two, eight-point In/Out card(s), field selectable to any combination to be either NFPA 72, Style B or D, initiating device circuits or NFPA 72, Style Y or Z, indicating appliance circuits or auxiliary control circuits.
9. Auxiliary control circuit contacts shall be single-pole, double-throw rated 2 amperes at 24V dc and 0.5 amperes at 120V ac.
10. Addressable expansion module for 127 addressable initiating alarm devices.
11. Two isolated EIA RS 232 communication port modules.

C. Central Processing Control Panel:

1. Modular construction with solid state, microprocessor-based programmable control processor, printer, operators console, and 10 levels of priorities for staging of system events.
2. Single-channel communication circuits for 512 control points for staging of system events.
3. Operators panel With:
   a. Single-line, 40-alphanumeric light emitting diodes.
   b. Individual keys for location information, silence signal, and detector reset.
   c. Lamp test pushbutton with associated light emitting diode.
   d. Priority and trouble alarm light emitting diode and associated acknowledge pushbuttons.
   e. Examine pushbuttons for "Monitor On" and activating control points.
4. Keyboard consisting of 48 keys labeled with letters, numbers, and options for programming and operational commands.

5. Printer with thermal print head for 20-column record system events produced in 80-column format.
6. Input/output parts as required for EIA RS 232 communication to local printer.
7. Selectable alarm verification and distribution processing.
8. Capable of Interfacing with Transponders Connected to Hardwire Circuits with:
   a. Analog/addressable or traditional detectors.
   b. Either normally open or normally closed contacts.
   c. Supervised and 24V dc operated fire alarm signaling circuits.
9. Capable of interfacing with NFPA 72 hard-wired, Style B and D, initiating device circuits and NFPA 72 hard-wired, Style Y and Z, indicating appliance circuits.

2.04 ADDRESSABLE DETECTOR BASE

A. Solid state circuitry with integral light emitting diode visual alarm, dip switch selectable addressing, and common base receptacle for ionization, photo-electric, and heat detectors.

B. Constantly monitors detector status and status changes.

C. Suitable for mounting on standard outlet box.

2.05 INDIVIDUAL ADDRESSABLE MODULES

A. Solid state circuitry with selectable latch/nonlatch operating conditions and mounting plate.

B. Monitors single and multiple devices with dry contacts.

C. Suitable for installing inside 4- by 4- by 2-1/8-inch electrical box.

2.06 ZONE ADDRESSABLE MODULES

A. Monitor module with solid state circuitry for four-wire detection circuits serving dry contact initiating devices.

B. Signal module with solid state circuitry for supervising and operating circuits serving 24V dc signals, speakers, and telephone devices.

C. Control module with solid state circuitry for supervised or nonsupervised control functions.

D. Modules complete with mounting plate suitable for installation in 4 by 4 by 2-1/2-inch electrical box having 1-1/2-inch deep extension ring.

2.07 UNIVERSAL TRANSPONDER

A. Solid state microprocessor-based electronics using digital transmission techniques for supervised sensing and signal circuits.

B. Interface capabilities with analog/addressable and traditional alarm or status inputs, control, or signal circuit outputs and communicate status changes to central processing unit.

C. Transponder modules group mounted in surface enclosures with access covers, 120V ac input, transfer switch, 24V dc output power supply and charger module, batteries, transient protection, and voltage monitor module.

D. Transponder type as required by circuit design, device, selection, and system configuration.

1. Basic transponder with eight digital monitoring, and four operation digital control points for initiating devices with normally open contacts or alarm contacts for devices with normally closed contacts.
2. Alarm transponder with eight digital monitoring, and three digital control points and detector reset for supervision and operation of 24V dc fire alarm signaling circuits.
3. Voice/phone transponder with five digital monitoring points, three voice, phone, or combination of voice and phone points and detector reset for supervision and operation of 25 VRMS speaker circuits, 24V dc telephone circuits and monitoring of initiating devices with normally open contacts.

E. Transponder tamper switch per UL 1076.

2.08 INITIATING DEVICES

A. Pull Stations:

1. Single-action stations for general alarm, complete with addressable transponder.
2. Constructed of die-cast metal with baked red enamel finish and raised white letter.
3. Hinged front cover having keyed reset lock.
4. Recessed pull handle keyed cylinder for single action.
5. Activated station pull handle latched in protruding position until reset by key.
6. All stations keyed alike with fire alarm control panel.
7. Screw terminal for field connections.

B. Heat Detectors:

1. Combination rate-of-rise and fixed, plug-in temperature elements with 90 degrees C trip setting, complete with addressable transponder mounting base.
2. Attach detector bases on recessed mounted octagon boxes. Conceal surface mounted boxes with surface trim skirt.
3. Double-screw terminals for supervised connection.
4. Normally open single-pole contacts rated 3 amperes.

C. Smoke Detectors:

1. Photo-electric type with plug-in, twist-lock addressable base per UL 217 and 268.
2. Solid state circuitry, nonradioactive photo-optic sensing chamber, suitable for device releasing service.
3. Concealed, field adjustable, sensitivity test switch.
4. Light emitting diode; pulsed indication for power availability and steady indication for activated detectors.
5. Self-Compensating Circuitry for:
   a. Voltage Range: 15 to 30V dc, 24V dc nominal.
   b. Temperature Range: 0 to 38 degrees C.
   c. Operating Temperature Range: Minus 10 to 50 degrees C.
   d. Humidity Range: 0 to 95 percent relative humidity.
6. Normally open single-pole contacts rated 3 amperes.
7. Detectors equipped with 30-mesh insect screen.
8. Photo-electric sensors adjusted to within 3 percent of UL 217 window obturation sensitivity valve.

D. Air Duct Smoke Detectors:

1. Duct mounted housing with pre-aligned sampling and exhaust tubes, analog sensing, solid state circuitry, and plug-in, twist-lock addressable base for photo-electric detector in accordance with UL 286A, NFPA 72E, 90A, and 101.
2. Sampling tubes to extend full width of branch air return duct.
3. Self-Compensating Circuitry for:
   a. Voltage Range: 15 to 30V dc, 24V dc nominal.
   b. Temperature Range: 0 to 38 degrees C.
   c. Humidity Range: 10 to 90 percent relative humidity.
   d. Velocity Range: 400 to 4,000 feet per minute.
4. Front mounted light emitting diode with pulsed indication for alarm condition.
5. Normally open, single-pole, double-throw auxiliary relay with 2 amperes, 125V ac rated contacts for resistive loads.

E. Detector Accessories: Remote test station and power-on indictor with light emitting diode alarm indicator and two-position, key-operated switch.

2.09 AUDIBLE ALARMS

A. General:

1. Polarized, 24V dc devices with sound power measured dB in accordance with UL 464.
2. Separate in/out wire leads for field connections.
3. Baked red color enamel finish.

B. Modular Horns:

1. Semiflush basic unit, complete with projector, designed for mounting on 4-inch square standard electrical box.
2. Manufacturer supplied box with flush grille plate and basic surface unit for recessed horns.
3. Explosion-Proof Horns: Vibrating diode type with sealed wires and tapped for 3/4-inch conduit in accordance with UL 1604.

2.10 VISUAL ALARMS

A. Polarized, 24V dc, 100 candela-second indicating output per UL 1638.

B. Solid state circuitry for high intensity control of xenon flashtube.

C. Tamper-proof, translucent molded polycarbonate, pyramidal shaped lens with "FIRE" in red lettering visible from 180-degree viewing field.

D. Polarized in/out wiring.

E. Designed for mounting on wall or ceiling mounted, single-gauge electrical box or as part of audible/visible base housing.

2.11 AUDIO VISUAL ALARMS

A. Audible/visible base housing with visual alarm and front mounted horn as specified.

PART 3 EXECUTION

3.01 GENERAL

A. Install and connect equipment in accordance with manufacturer's instructions and recommendations.

B. Mount all devices in accordance with manufacturer's instructions.

C. Detector light emitting diodes readily visible from floor.

D. Arrange sampling tubes and duct detectors to monitor entire duct area and point of duct penetration sealed and reinsulated.

3.02 CONDUCTORS

A. In accordance with Section 16120, Conductors, and NFPA 70, Article 760.

B. Install initiating alarm, signal, and communication conductors in separate and independent raceway system.

C. All circuit wiring color-coded, as established by installer, to be maintained throughout the installation.

3.03 FIELD QUALITY CONTROL

A. In accordance with Section 01810, Equipment Testing and Facility Startup, and NFPA 72H.

B. Tests performed in presence of code-enforcing authorities and Engineer.

C. Upon completion of tests, complete NFPA 72 Fire Alarm System Certification and Description form.

3.04 MANUFACTURER'S SERVICES

A. Furnish manufacturer's representative in accordance with Section 01640, Manufacturers' Services, for the following services at Site or classroom as designated by owner, for minimum person-days listed below, travel time excluded:

1. 1 person-day for installation assistance and inspection.
2. 1 person-day for functional and performance testing.
3. 1 person-day for prestartup classroom or Site training.

3.05 PROTECTION OF INSTALLED WORK

A. Touchup scratches, mars, dents, etc., incurred during shipment or installation of equipment.

B. If required because of extensive damage, as determined by Engineer, refinish the entire assembly.

END OF SECTION

SECTION 13930
FIRE SUPPRESSION SPRINKLER SYSTEM

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. Factory Mutual (FM) Global (FMG).
2. National Fire Protection Association (NFPA): 13, Standard for the Installation of Sprinkler Systems.
3. Underwriters Laboratories Inc. (UL).

1.02 DESIGN REQUIREMENTS

A. General:

1. Design the fire suppression sprinkler system in accordance with the requirements of this Section.
2. Coordinate the design of the fire suppression sprinkler system with the authorities having jurisdiction in the Project locality. Obtain required permits and arrange for inspections required by such permit.
3. Coordinate fire suppression sprinkler system routing with building structure, other piping, ductwork, and electrical.
4. Verify and incorporate into the design the actual water pressure and available water flow for the fire suppression sprinkler system.
5. The Drawings and Hydraulic Calculations shall be signed and sealed by a professional engineer registered in the State of Florida.

B. Pipe and Fittings:

1. Refer to Pipe Schedule, Section 15100, Plumbing Piping and Accessories.
2. Carbon Steel: In accordance with NFPA 13.
3. Cement-Lined Ductile Iron: As specified in Section 15100-14, DS-Cement-Mortar-Lined Ductile Iron Pipe and Fittings.
4. Fire service piping from the site utility main to the building riser shall be listed for fire protection service.

C. Valves:

1. Valves: As specified in Section 15202, Valves and Operators:
   a. System Control:
      1) 2 Inches and Smaller: Type V140.
      2) 3 Inches and Larger: Type V136.
   b. Globe Valve, 2 Inches and Smaller: 175 psig, listed for fire protection trim and drains, all bronze, screw in bonnet, integral seat, renewable disc, UL listed.
   c. Manufacturers:
      1) Nibco; Straight pattern Model KT-211-W-UL. Angle pattern Model T-301-W.
      2) Fire Protection Products Inc.
      3) Crane.
   d. Fire Department Connection Valve: Check with ball drip, Type V610.
   e. Wet Pipe Riser Valve: Type V644.
2. Indicating type, with supervisory switches. Supervision shall be in the OPEN position such that closing of valves results in alarm.
3. Double Check Valve Assembly: Type V640 as specified in Section 15202, Process Valves and Operators.

D. Automatic Wet Pipe System (Transfer Station Building):

1. With exception of electrical room, protect entire facility by an automatic wet pipe system.
2. Class 3 Commodities Piled: 25 feet maximum height.
3. Hydraulic Operation Area: 2,000 square feet at an area/density rating of 0.38 gpm per square foot, with 1.15 safety factor.
4. Floor control valve assemblies at each floor level, each riser. Supervise floor control valves to alarm on closure. Pipe floor control valve drains to building drainage system.
5. Design sprinkler system to interface with Section 13850, Fire Alarm.

E. Automatic Wet Pipe System: (HHW Building)

1. With exception of Electrical Room, protect the facility by an automatic wet pipe system in the areas shown on the Drawings.
2. Hazard Occupancy: Ordinary, Group 2.
3. Hydraulic Operation Area: 1,500 square feet at an area/density rating of 0.20 gpm per square foot.
4. Pipe valve drains to building drainage system.
5. Design sprinkler system to interface with Section 13850, Fire Alarm.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Reflected ceiling plans showing sprinkler head locations.
   b. Schematic, wiring, and interconnection diagrams of system.
   c. Catalog cuts of system components.
   d. Design calculations.
   e. Sprinkler Piping Drawings prepared per NFPA 13.
   f. Pipe and fitting materials and methods for joining.

B. Informational Submittals:

1. Written documentation showing proof of system designer's and installer's qualifications.
2. Manufacturer's installation instructions for supervisory switches.
3. Certificate of Compliance: Upon completion of the system installation, verify all fire department hose connections, and check all fire safety devices to ensure their readiness for emergency connection and operation.
4. Manufacturer's Certificate of Proper Installation.
5. Written evidence that required permits have been secured and that inspections and acceptance tests have been satisfactorily performed.
6. Written test reports of each test and inspection.
7. Operation and Maintenance Data: As specified in Section 01001, General Requirements.

1.04 QUALITY ASSURANCE

A. Qualifications: Design and installation shall be performed by persons with an established reputation in the fire protection industry who can furnish a list of satisfactory installations of the type of system specified.

B. Regulatory Requirements:

1. National Fire Codes.
2. Uniform Fire Code.
3. International Fire Code.
4. Requirements of Owner's insurance underwriter, if applicable.
5. City or State authorities having jurisdiction.

PART 2 PRODUCTS

2.01 GENERAL

A. Materials manufactured within scope of Underwriters Laboratories Inc. shall conform to UL Standards and have an applied UL listing mark.

B. All equipment shall be FMG approved.

2.02 VALVES

A. Indicating type, with supervisory switches. Supervision shall be in the OPEN position such that closing of valves results in alarm.

2.03 SUPERVISORY SWITCH

A. Suitable for either OS&Y gate valve or indicator post.

B. Capable of operating between first and second revolution of valve control wheel or if housing cover is removed.

C. Rating: 5-amp, 120V ac and 2.5-amp, 24V dc.

D. Manufacturers:

1. Potter.
2. Chemetron.

2.04 FLOW DETECTOR SWITCH

A. Switch shall actuate on flow of water that equals or exceeds the discharge from one sprinkler head.

B. Minimum Rating: 5-amp, 120V ac and 2.5-amp, 24V dc.

C. Pneumatic retard element with an adjustable range of zero to 70 seconds.

D. Two contacts (DPDT) suitable for providing a signal to the local fire alarm bell and light, and remote fire alarm system.

E. Manufacturers:

1. Notifier.
2. Viking.

2.05 FIRE ALARM BELL

A. Ten-inch outdoor type, surface mounted with weatherproof back box, 120V, single-phase.

B. Housing fabricated of aluminum with red baked enamel finish.

C. Manufacturers:

1. Notifier.
2. Simplex.
3. Federal Sign and Signal Co.

2.06 FIRE DEPARTMENT CONNECTION

A. Pedestal mounting type, cast brass body with drop clappers, bottom inlet, 4-inch by 2-1/2-inch by 2-1/2-inch size.

B. Unit Finish: Polished brass plate and caps with chains. Engrave AUTOMATIC SPRINKLER on finish plate.

C. Manufacturers and Products:

1. Potter-Roemer; 5700 Series.
2. Powhatan; Brass 22-229.
3. Elkhart; Model 163.

2.07 SPRINKLER HEAD

A. Temperature Rating: 212 degrees F required for sprinklers mounted at roof structure, 165 degrees F in other areas.

B. All sprinkler heads in Transfer Station Building shall be lead plated and wax coated.

C. Manufacturers:

1. Viking Corp.
2. Central Sprinkler Corp.
3. Reliable.

2.08 PIPE HANGERS AND SUPPORTS

A. In accordance with NFPA 13.

B. Pipe hanger material shall be precoated steel with stainless steel rods, nuts and bolts, and beam clamps.

2.09 SWAY BRACING

A. In accordance with NFPA 13.

2.10 VALVE IDENTIFICATION TAGS

A. In accordance with NFPA 13.

PART 3 EXECUTION

3.01 VALVES

A. Control Valves: Where more than one control valve is required, provide identification signs indicating portion of the total system controlled by respective valve, on valve, or on wall near valve location as specified in accordance with NFPA 13.

B. System Test and Drain Valves:

1. Where valves are located above ceilings with removable panels, install panels with a nametag that allows readily visible identifying test valve location.
2. Where valves are installed above fixed ceilings, install an access panel, and paint to match ceiling color with identification tag for valve.
3. Install drain valves in portions of system that cannot drain by gravity to main drain valve.

3.02 SUPERVISORY SWITCH

A. Provide on each fire protection system control valve.

B. Install in accordance with manufacturer's instructions and as specified in Section 15202, Plumbing Valves and Operators.

C. Make electrical connections specified in Section 13850, Fire Alarm.

3.03 SPRINKLER HEAD

A. Provide chrome-plated canopy flanges on pendant sprinkler heads in finished ceilings.

B. Provide brass pendant or upright heads in unfinished areas.

C. Provide guards on sprinkler heads located in areas where heads are subjected to mechanical damage.

D. Spare Heads:

1. Provide in accordance with NFPA 13, mounted in manufacturer's standard metal cabinet.
2. Mount cabinet on wall near fire protection riser.

3.04 FLOW DETECTOR SWITCH

A. Do not mount switch in a pipe fitting or within 12 inches of fittings that change direction of waterflow.

B. Electrical connection as specified in Section 13850, Fire Alarm.

3.05 FIRE ALARM BELL

A. Mount on building exterior directly above fire department connection.

B. Make electrical connections according to Section 13850, Fire Alarm.

3.06 PIPE HANGERS AND SUPPORTS

A. Spacing, location, and installation in accordance with NFPA 13.

3.07 FIELD FINISHING

A. Paint all fire sprinkler distribution piping OSHA red, and provide flow direction identification.

B. Shop and field painting shall be as specified in Section 09900, Painting and Protective Coatings, System No. 5.

C. Do not paint the fire sprinkler heads.

3.08 FIELD QUALITY CONTROL

A. Upon completion of fire protection system, perform acceptance test as required and outlined in NFPA 13.

B. Notify the authority having jurisdiction of acceptance test readiness.

3.09 PERFORMANCE TEST

A. Test in accordance with NFPA 13.

B. Perform under actual or approved simulated operating conditions.

C. Test for a continuous 3-hour period without malfunction.

D. Perform with the Engineer and authority having jurisdiction present.

END OF SECTION

SECTION 13931
HIGH EXPANSION FOAM (HEF)
FIRE PROTECTION SYSTEM

PART 1 GENERAL

1.01 REFERENCES

1. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to within the text by the basic designation only.
2. American National Standards Institute (ANSI): A13.1: (1966; R 2002) Scheme for Identification of Piping Systems.
3. ASME International (ASME):
   a. B16.1: (1998) Cast Iron Pipe Flanges and Flanged Fittings.
   b. B16 3: (1998) Malleable Iron Threaded Fittings.
   c. B16.4: (1998) Gray Iron Threaded Fittings.
   d. BPVC SEC VIII D1: (2001) Boiler and Pressure Vessel Code; Section VIII, Pressure Vessels Division 1 – Basic Coverage.
4. ASTM International (ASTM):
   a. A183: (2003) Carbon Steel Track Bolts and Nuts.
   b. A193: (2004c) Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service.
   c. A312: (2004b) Seamless and Welded Austenitic Stainless Steel Pipes.
   d. A351: (2003) Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure Containing Parts.
   e. A403: (2004) Wrought Austenitic Stainless Steel Piping Fittings.
   f. A449: (2004a) Quenched and Tempered Steel Bolts and Studs.
   g. A47: (1999) Ferritic Malleable Iron Castings.
   h. A53: (2004a) Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
   i. A536: (1984; R 2004) Ductile Iron Castings.
   j. A795: (2000) Black and Hot Dipped Zinc Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use
5. FM Global (FM): P7825a: (2005) Approval Guide Fire Protection.
6. Institute of Electrical and Electronics Engineers (IEEE): C62.41: (1991; R 1995) Recommended Practice for Surge Voltages in Low Voltage AC Power Circuits.
7. National Fire Protection Association (NFPA):
   a. 11: (2005) Low, Medium, and High Expansion Foam Systems.
   b. 13: (2002) Installation of Sprinkler Systems.
   c. 70: (2005) National Electrical Code.
   d. 72: (2002) National Fire Alarm Code.

8. Underwriter's Laboratories (UL):
   a. 1638: (2001; Rev. thru Nov. 2003) Visual Signaling Appliances – Private Mode Emergency and General Utility Signaling.
   b. FPED: (2006) Fire Protection Equipment Directory.

1.02 SCOPE OF WORK

A. Provide a high expansion foam (HEF) system to protect areas of the Household Hazardous Waste Building, as indicated on the Drawings.

1. HEF system design and equipment is based on the equipment and products available from the Ansul Corporation of Marinette, Wisconsin, as specified herein.
2. Provide HEF system risers with valves and appurtenances as indicated on the Drawings and as described in this Section.
3. Provide HEF generator heads described in this section.
4. Contractor shall provide the quantity of foam generator heads and the discharge capacity of the foam generator heads in accordance with NFPA 409 or NFPA 11.
5. Provide pipe supports, hangers, and bracing as required by the drawings and this Section.

B. Provide an HEF vertical diaphragm concentrate tank proportioning system with HEF concentrate for initial tank filling, testing, and refilling at the conclusion of the final acceptance testing. A reserve supply of HEF concentrate shall not be required.

1.03 SUBMITTALS

A. The following shall be submitted in accordance with Division 1, General Requirements:

1. As-Built Drawings.
2. Post-Discharge Test Requirements: Details of method proposed for required tests at Final Acceptance, including step-by-step test procedures; list of equipment to be used; names, titles, and affiliations and qualifications of personnel who will participate in the tests; methods for protecting the facility and equipment during testing; means for containing the HEF solution during discharge tests; and proposed means for disposal. Test plan shall include a drawing showing proposed number and arrangement of fire hoses and nozzles proposed for use in testing foam proportioners. Blank forms the Contractor plans to use to record test results shall be included.
3. Test Reports: As follows:
   a. Reports as outlined in NFPA 11 documenting results of flushing and hydrostatic tests.
   b. Trip tests of automatic water control valves.

c. Test report of concentrate proportioning system. Report shall include all pressure readings and settings of pumps, pressure sustaining valves, relief valves and similar system components. Report shall include conductivity readings for foam samples. Report shall be signed by the factory trained technical representative employed by the HEF concentrate manufacturer.

d. Test report of the foam system control panel (FSCP) and initiating and indicating devices. Report shall include a unique identifier for each device with an indication of test results. Report shall be signed by the factory trained technician employed by the control panel manufacturer.

4. HEF Operation and Maintenance Data.

1.04 HEF SYSTEM

A. The total flooding HEF system shall consist of an automatic deluge type high expansion foam fire protection system, and shall be provided for the areas indicated on the drawings. Except as modified herein, the system shall meet the requirements of NFPA 11, NFPA 13, and NFPA 72.

1.05 SYSTEM OPERATIONAL FEATURES

A. Manual release stations, or flow through a wet-pipe sprinkler riser, shall cause the HEF system automatic water control (deluge) valves to open, foam concentrate to enter proportioners, and foam-water solution to be discharged from all the high expansion foam generator heads.

B. Hydraulic Calculations for the HEF and Wet-Pipe Sprinkler Systems: Detailed computer generated hydraulic calculations shall be prepared. Demand type hydraulic calculations shall be provided to demonstrate the Contractor's pipe sizing provides adequate HEF discharge and wet-pipe sprinkler discharge. Additionally, the Contractor shall perform a supply type hydraulic calculation of the HEF system. Using this calculation, the quantity of HEF concentrate required to provide 15 minutes of discharge duration shall be verified. Velocity in the HEF piping shall not exceed 20 feet per second.

1.06 SUBMITTAL PREPARER'S QUALIFICATIONS

A. The fire protection system submittals, including as-built drawings, shall be prepared by an individual who is either a registered professional engineer with ten years of experience designing HEF systems or who is certified as a level IV Technician by the National Institute for Certification in Engineering Technologies (NICET) in Automatic Sprinkler System Layout subfield of Fire Protection Engineering Technology in accordance with NICET.

1.07 INSTALLER'S QUALIFICATIONS

A. The installer shall be experienced and regularly engaged in the installation of the type and complexity of fire protection systems included in this project. A statement prior to submittal of any other data or drawings, that the proposed installer is regularly engaged in the installation of the type and complexity of systems included in this project shall be provided. In addition, data identifying the locations of at least three systems recently installed by the proposed installer which are comparable to the system specified shall be submitted. Contractor shall certify that each system has performed satisfactorily, in the manner intended, for a period of not less than 6 months.

1.08 REGULATORY REQUIREMENTS

A. The advisory provisions of NFPA standards and recommended practices specified shall be considered mandatory, as though the word "shall" had been substituted for "should" wherever it appears.

1.09 SPARE PARTS

A. The Contractor shall submit spare parts data for each different item of material and equipment specified. A list of special tools and test equipment required for maintenance and testing of the products supplied by the Contractor shall be included.

PART 2 PRODUCTS

2.01 STANDARD PRODUCTS

A. Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

2.02 REQUIREMENTS FOR FIRE PROTECTION SERVICE

A. All equipment and material shall have been tested by UL, and listed in UL FPED or approved by FM and listed in FM P7825a. Where the terms "listed" or "approved" appear in this specification, such shall mean listed in UL FPED or FM P7825a. The omission of these terms under the description of any item of equipment described shall not be construed as waiving this requirement.

2.03 PRESSURE RATINGS

A. Valves, fittings, couplings, proportioners, alarm switches, strainers, and similar devices shall be rated for the maximum working pressures that can be experienced in the system, but in no case less than 175 psi. Surge arrestors shall have a rated working pressure of not less than 275 psi.

2.04 NAMEPLATES

A. Major components of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate permanently affixed to the item of equipment.

2.05 ABOVEGROUND PIPING SYSTEMS FOR WATER OR HEF SOLUTION

A. Pipe: Pipe shall be standard weight conforming to ASTM A795 or ASTM A53. Pipe 6-inch diameter and smaller shall be Schedule 40. Pipe shall be marked as to the brand or name of the manufacturer, kind of pipe and the ASTM designation in accordance with the "Product Marking" provisions of the ASTM standard.

B. Grooved Fittings and Couplings: Grooved fittings, couplings and bolts shall be provided by the same manufacturer. Fittings and couplings shall be malleable iron complying with ASTM A47 or ductile iron complying with ASTM A536. Couplings shall be of the rigid type except that flexible type will be provided where flexible joints are specifically required by NFPA 13. Coupling gaskets shall be Grade E (EPDM) approved for dry pipe fire protection service. Gasket shall be the flush type that fills the entire cavity between the coupling and the pipe. Nuts and bolts shall be heat treated steel conforming to ASTM A183 and shall be cadmium plated or zinc electroplated.

C. Non-Grooved Fittings: Shall be threaded or flanged. Threaded fittings shall be cast iron conforming to ASME B16.4 or malleable iron conforming to ASME B16.3. Flanged fittings shall be cast iron conforming to ASME B16.1. Plain end fittings with mechanical couplings, fittings which require drilling a hole in the pipe, and fittings which use steel gripping devices to bite into the pipe, shall not be used.

D. Flanges and Gaskets: Flanges shall conform to NFPA 13 and ASME B16.1. Flanges shall be the type that are welded or threaded to the pipe. Flanges which are bolted to grooved pipe will not be permitted. Gaskets shall be full-face type EPDM or other approved material.

1. Bolts: Bolts shall be ASTM A449, Type 1 or 2. Bolts shall extend no less than three full threads beyond the nut with bolts tightened to the required torque.
2. Nuts: Nuts shall be ASTM A193, Grade 5.
3. Washers: Washers shall meet the requirements of ASTM F436. Flat circular washers shall be provided under all bolts heads and nuts.

E. Pipe Hangers: Hangers shall be precoated steel, listed in UL FPED or FM P7825a and be of the type suitable for the application, construction and size pipe involved.

F. Control Valve: Unless otherwise indicated, valves shall be indicating type in accordance with NFPA 13. Valves 2-1/2 inch and larger shall be flanged outside screw and yoke (OS&Y) type.

G. Check Valve: Check valves 4 inches and larger shall be flanged, swing type, cast or ductile iron body and cover, cast or ductile iron clapper with replaceable EPDM rubber facing. Valves shall be suitable for either vertical or horizontal mounting and equipped with a removable handhole cover. The direction of flow shall be indicated by an arrow cast in the valve body. The valve body shall include plugged pipe thread connections for a 2 inch drain.

2.06 ABOVEGROUND PIPING SYSTEMS FOR HEF CONCENTRATION

A. Pipe: Pipe shall be standard weight, Schedule 40, stainless steel conforming to ASTM A312, Grade TP 304L.

B. Fittings: Seamless socket weld type or flanged type fittings shall conform to ASTM A403, Grade WP 304L, and shall be compatible with the pipe. Grooved type fittings and couplings, where allowed by ANG ETL 01-1-1, shall be of Type 316 stainless steel conforming to ASTM A351.

C. Piping System Gaskets: Gaskets shall be compatible with the HEF concentrate solution. Gasket material shall be BUNA-N, EPDM, Teflon, Viton, or Blue-Gard Style 3000.

D. Pipe Hangers: Hangers shall be precoated steel, listed in UL FPED or FM P7825a and be of the type suitable for the application, construction and size pipe involved.

E. Control Valves: Valve shall be indicating type with full port ball and operating handle that indicates the ON/OFF positions of the valve. Unit shall be socket weld or flanged type. Valve body and ball shall be Type 316 stainless steel, complying with ASTM A351. The valve handle shall be provided with a suitable and substantial means for securing the valve open with a key operated locking device.

2.07 AUTOMATIC WATER CONTROL VALVE ASSEMBLY (DELUGE VALVE)

A. Water control valve shall be an electrically actuated type rated for a maximum working pressure of 250 psi. The control valve shall be re-settable without opening the valve and without the use of special tools. Electrical solenoid valve used to actuate the water control valve shall be an integral component of the valve or shall be approved for use by the water control valve manufacturer and the control panel (FSCP) manufacturer. Solenoid valve shall be of the normally closed, de-energized type which opens when energized upon receipt of an electrical signal from the control panel to which it is connected. Solenoid valves used with diaphragm type valves shall be rated for a

maximum pressure equal to that of the associated valve. Water control valve shall be equipped with a means to prevent the valve from returning to the closed position until being manually reset. Assembly shall be complete with the valve manufacturer's standard trim piping, drain and test valves, pressure gauges, and other required appurtenances. Each assembly shall include an emergency release device for manually tripping the water control valve in the event of a power or other system failure. Device shall be a standard accessory component of the valve manufacturer and shall be labeled as to its function and method of operation. Valves located in hazardous locations shall be approved for the hazard classification of the area where located.

2.08 HEF DISCHARGE DEVICES

A. High Expansion Foam Generator Heads: The foam generator heads shall not require any outside power source. The high expansion foam generator heads shall be UL listed and/or FM approved. Furnish low pressure loss heads as manufactured by Ansul Fire Protection.

2.09 HEF LIQUID CONCENTRATE

A. HEF concentrate shall be formulated for a 2.75 percent solution. Mixing of non-identical brands of concentrate will not be permitted. Basis of design concentrate is the product of Ansul Fire Protection. Contractor shall provide concentrate and concentrate fill pump for tests, and refill HEF system upon completion of tests.

2.10 DIAPHRAGM TANK BALANCED PRESSURE PROPORTIONING SYSTEM

A. Tank shall be a steel pressure vessel constructed in accordance with ASME BPVC SEC VIII D1. ASME label shall be permanently affixed to the tank. Tank shall be vertically mounted on steel saddles and shall contain a full internal diaphragm (bladder). Diaphragm shall be nylon reinforced Buna-N-rubber or other approved material conforming to the inside shape of the tank. HEF concentrate shall be stored inside the diaphragm and the concentrate shall not be in contact with the steel tank. The tank shall have perforated PVC tubes installed inside the diaphragm to assure full displacement of the stored concentrate. Tank shall be equipped with the manufacturer's standard fittings and trim, including HEF fill and drain connections, water fill and drain connections, and concentrate sight gauge.

2.11 BALANCED PRESSURE PROPORTIONER

A. The proportioner shall be a standard balanced pressure type unit capable of proportioning HEF liquid at 2.75 percent, (2.75 parts concentrate to 97.25 parts water by volume solution) at flow rates within the flow range of the proportioner. Major components of the proportioner, including the body, inlet nozzle and metering orifice shall be of brass, bronze or stainless steel.

The body shall be clearly marked with a flow direction arrow, and the type and percent of HEF concentrate that it was designed to proportion. The proportioner size shall be a maximum size of 6 inch.

2.12 HEF CONCENTRATE CONTROL VALVE ASSEMBLY

A. Assembly shall be specifically designed and constructed to control HEF concentrate to proportioners and shall be arranged to open upon application of water or HEF solution pressure from the alarm check or automatic water control valve to which it is connected. Valve shall be a listed or approved automatic control valve specifically intended for this application or a full port ball valve. All components shall be constructed of brass, bronze or stainless steel, except that the internal portions of listed or approved fire protection valves subjected to HEF concentrate may be provided with a coating warranted by the manufacturer to protect the valve from the deleterious effects of the concentrate. All components shall be rated for working pressure of 175 psi.

2.13 FOAM SYSTEM CONTROLS

A. Foam System Control Panel (FSCP) shall be UL listed or FM approved for "Releasing Device Service" or shall have modules approved for this purpose. Panel shall be addressable unit having an output capability and contain components and equipment required to provide the specified operational and supervisory functions of the system. Components shall be housed in a surface mounted, water-tight, steel cabinet with hinged door and cylinder lock. Panel shall include integral "power on", "alarm", and "trouble" LED's with annunciation of each alarm, supervisory and trouble signal. LED's and fuses mounted on circuit boards shall be identified by permanent markings on the circuit board. Nameplates for fuses shall also include ampere rating. Control panel switches shall be within the locked cabinet. A suitable means shall be provided for testing the control panel visual indicating devices (meter and LED's). Meters and LED's shall be plainly visible when the cabinet door is closed. Signals shall be provided to indicate and annunciate, by zone, any alarm, supervisory or trouble condition on the system. Upon restoration of power, start-up shall be automatic, and shall not require any manual operation. The loss of primary power or the sequence of applying primary or emergency power shall not affect the transmission of alarm, supervisory or trouble signals. Transient voltage surge suppression (TVSS) shall be provided on all fire alarm circuits.

1. Zone Annunciator: Visual annunciators shall be provided for each active zone and spare zone. A minimum of two spare alarm zones that are fully operational shall be provided. Zone identification shall consist of a unique zone number as well as a word description of the zone. Zones shall be arranged as shown on the Drawings.
2. System Zoning: The system shall be zoned as shown on the Drawings.

3. Primary Power Supply: Primary power and trouble alarm power to Control Panel shall be supplied from two 120V ac circuits. Power to the Control Panel shall be as indicated. Disconnect switch shall be permanently marked "FOAM FIRE PROTECTION SYSTEM".
4. Emergency Power Supply: Emergency power shall be provided for system operation in the event of failure of the primary power supply and shall consist of rechargeable storage battery system. Transfer from normal to emergency power or restoration from emergency to normal power shall be automatic and shall not cause transmission of a false alarm.
   a. Storage Batteries: Storage batteries shall be sealed, lead-calcium type requiring no additional water. The batteries shall have ample capacity, with primary power disconnected, to operate the system for a period of 60 hours. Following this period of operation via batteries, the batteries shall have ample capacity to operate alarm indicating devices in the alarm mode for a minimum period of 5 minutes. Battery cabinet shall be a separate cabinet. The battery compartment or cabinet shall have twice the volume of the batteries. Batteries shall set on a non-corrosive and non-conductive base or pad. Batteries in the Control Panel shall be located at the bottom of the panel.
   b. Battery Charger: Battery charger shall be completely automatic, with high/low charging rate, capable of restoring the batteries from full discharge to full charge within 24 hours. A separate ammeter shall be provided for indicating rate of charge. A separate voltmeter shall be provided to indicate the state of the battery charge. A pilot light indicating when the batteries are manually placed on a high rate of charge shall be provided as part of the unit assembly if a high rate switch is provided. Charger shall be located in Control Panel cabinet.

2.14 ALARM INITIATING DEVICES

A. Sprinkler Water-flow Indicator Switch, Vane Type: Switch shall be vane type with a pipe saddle and cast aluminum housing. The electro-mechanical device shall include a flexible, low-density polyethylene paddle conforming to the inside diameter of the fire protection pipe. The device shall sense water movements and be capable of detecting a sustained flow of 10 gpm or greater. The device shall contain a retard device adjustable from 0 to 90 seconds to reduce the possibility of false alarms caused by transient flow surges. The switch shall be tamper resistant and contain two SPDT (Form C) contacts arranged to transfer upon removal of the housing cover, and shall be equipped with a silicone rubber gasket to assure positive water seal and a dustproof cover and gasket to seal the mechanism from dirt and moisture.

B. Water-flow Pressure Alarm Switch: Unit shall include a 1/2-inch NPT male pipe thread, two 1/2-inch conduit knockouts, and two sets of SPDT (Form C) contacts. The switches shall be factory adjusted to transfer the contacts at 4 to 8 psi on rising pressure. Unit shall include a watertight NEMA 4 die-cast aluminum housing with a tamper-resistant cover which requires a special key for removal. The cover shall be provided with a tamper switch which shall operate upon removal of the cover. Units used on wet pipe systems shall have an adjustable, instantly recycling pneumatic retard to prevent false alarms due to water pressure variation. Retard adjustment shall be factory set at approximately 20-40 seconds and adjustable between 0 to 90 seconds.

C. HEF System Actuation Station: Unit shall be dual-action type requiring the lifting of a cover and pulling of a ring to actuate. It shall not require the breaking of glass to actuate. Unit shall be factory finished yellow and include a cast or engraved label indicating Foam System with operating instructions clearly marked on the station cover. Alarm contacts shall have a minimum rating of 120V ac, 60-Hz, 6 amps. Contact gap distance shall be factory set and not be field adjustable. Unit shall be compatible with the Control Panel to which it is connected. Unit shall not be listed or approved for use in hazardous locations.

1. Enclosure and Signage: The enclosure shall be a tamper-resistant, clear polycarbonate shield and frame that fits over the manual actuation station. The unit shall be hinged of the top and suitably labeled "Lift Here" on the bottom to indicate means of gaining access to the manual actuation station it protects. It shall include a spacer as required to accommodate its use with a surface mounted manual actuation station. Signage shall be mounted behind the unit, with the station and cover approximately centered within the sign. The sign shall be yellow. The words, "Start Foam System" shall appear on the sign, above the hinged plastic cover. The words shall be in red lettering, not less than 3 inches high, on a lime yellow background.

D. Temperature Sensors: Sensors shall be surface mounted housed in an epoxy sealed stainless steel case with bi-metallic operating mechanism. The contacts shall be hermetically sealed silver clad, either normally open or normally closed with screw terminals. Units shall be rated 1 amp at 24 volts dc. Temperature setting shall be factory preset at 40 degrees F, plus or minus 5 degrees F (4.5 degrees C, plus or minus 3 degrees C). Sensor shall automatically reset to normal state when the temperature rises above 40 degree F. The sensor units shall be highly resistant to vibration and corrosion and highly sensitive to temperature change. There shall be no sensitivity loss due to aging and no need to replace sensing element due to repetitive operation.

2.15 VALVE SUPERVISORY (TAMPER) SWITCH

A. Switch shall be designed to monitor the open condition of each water or HEF concentrate control valve to which it is mounted. It shall include a cast aluminum housing, tamper proof cover, two sets of single pole, double throw (SPDT) contacts and brackets and J-bolts needed for mounting. Removal of the cover shall cause both switches to operate.

2.16 NOTIFICATION APPLIANCES

A. Notification appliances shall be suitable for connection to supervised alarm indicating circuits. Appliances shall have a separate screw terminal for each conductor.

1. Electronic Signaling Device: Device shall be surface mounted type which can be mounted to a standard 4 inch square back box. Electronic device shall operate on a nominal 24V dc, shall be polarized for line supervision and shall have screw terminals for in-out wiring. Device shall be provided with three field selectable sounds (horn, warble, siren) and three sound output levels to 102 DBA in an anechoic chamber at 3m.
2. Alarm Horn: Horn shall be surface mounted, with the matching mounting back box surface mounted, vibrating type suitable for use in an electrically supervised circuit. Horns shall operate on nominal 24V dc and have screw terminals for in-out wiring connection. Sound output shall be a minimum of 90 DBA at 10 feet. Horns used in exterior locations shall be specifically listed or approved for outdoor use and be provided with metal housing and protective grills.
   a. Blue Strobe Units: Device shall be surface mounted type which can be mounted on a standard 4-inch square back box. Device shall operate on nominal 24V dc, shall be polarized for line supervision, and shall have screw terminals for in-out wiring. Strobe units shall have blue lenses, solid state flashing units, and shall output blue light. Units shall conform to the applicable requirements of UL 1638 for general visual signaling devices. Flashing units shall have an effective intensity of 110 candela. Strobe flash rate shall be between one to three flashes per second. Strobe units located within a common viewable space shall be synchronized to flash in unison.

PART 3 EXECUTION

3.01 INSTALLATION

A. Aboveground Piping: Piping shall be installed straight and bear evenly on hangers and supports. Sprinkler system piping shall be pitched as if it were being installed in areas subject to freezing. Piping shall be concealed in areas with suspended ceiling and shall be inspected, tested and approved before being concealed.

1. Joints: Pipe joints shall conform to NFPA 13. Not more than four threads shall show after joint is made up. Joint compound shall be applied to male threads only. Joints shall be faced true, provided with gaskets and made square and tight. Flanged joints or mechanical groove couplings shall be provided where indicated or required by NFPA 13. Grooved pipe and fittings shall be prepared in accordance with the manufacturer's latest published installation instructions. All grooved couplings and fittings shall be from the same manufacturer. Grooved joints shall not be used in concealed locations, such as behind solid walls or ceilings, unless an access panel is shown on the Drawings for servicing or adjusting the joint.
2. Reducers: Reductions in pipe sizes shall be made with one-piece tapered reducing fittings. The use of grooved end or rubber gasketed reducing couplings will not be permitted.
3. Pipe Supports and Hangers: Installation methods outlined in NFPA 13 are mandatory.
4. Pipe Penetrations: Cutting structural members for passage of pipes or for pipe hanger fastenings will not be permitted. Pipes penetrating concrete or masonry walls or concrete floors shall be provided with pipe sleeves fitted into place at the time of construction through its respective wall or floor, and shall be cut so that the sleeve protrudes a minimum of 2 inches on each side of the wall or floor surface. Sleeve sizes and clearance between pipe and sleeve shall be in accordance with NFPA 13. Where pipes pass through fire walls, fire partitions, or floors, a fire seal shall be placed between the pipe and sleeve.
5. Piping Pitch: Piping shall be pitched to the main drain or to auxiliary drains provided as required to facilitate draining. Branch lines shall be pitched at least 1/2 inch in 10 feet and cross mains and feed mains shall be pitched to at least 1/4 inch in 10 feet.

6. Escutcheons: Escutcheons shall be provided at finished surfaces where exposed piping passes through floors, walls, or ceilings except in boiler, utility, or equipment rooms. Escutcheons shall be fastened securely to pipe and shall be chromium plated iron or chromium plated brass, either one piece or split pattern, held in place by internal spring tension or setscrew.
7. Drains: Main drain piping shall be provided to discharge at safe points outside each building. Drains shall be of adequate size to readily receive the full flow from each drain under maximum pressure. Auxiliary drains shall be provided as required by NFPA 13 except that drain valves shall be used where drain plugs are otherwise permitted. Where branch lines terminate at low points and form trapped sections, such branch lines shall be manifolded to a common drain line. Each drain valve shall be provided with a metal sign identifying the type of drain connection or function of the valve.
8. Identification Signs: Signs shall be in accordance with NFPA 13. Properly lettered and approved metal signs shall be suitably affixed to each control valve, inspector test valve, main drain, auxiliary drain, test valve, and similar valves as appropriate. All equipment identification signage shall be engraved on metal or plastic material and mechanically attached to the facility.

3.02 ELECTRICAL WORK

A. Unless otherwise specified, power supply equipment and wiring shall be in accordance with Division 26, Electrical.

B. Grounding: Grounding shall be provided to building ground.

C. Control Panel (FSCP): The Control Panel and its assorted components shall be mounted so that no part of the enclosing cabinet is less than 24 inches or more than 78 inches above the finished floor.

D. Manual Actuation Stations: Manual actuation stations shall be mounted readily accessible and 42 inches above the finished floor.

E. Notification Appliances: Notification appliances shall be mounted a minimum of 8 feet above the finished floor unless limited by ceiling height.

F. Temperature Sensors: Temperature sensors shall be mounted on the ceiling of the protected space. Sensors shall be connected to the fire alarm control panel.

3.03 PIPE PAINTING AND LABELING

A. Painting: Steel pipe will be painted. Stainless steel pipe shall not be painted. Piping will be painted OSHA red.

B. Pipe Identification: Aboveground pipe 2-inch diameter and larger shall be identified with legends no further than 25 feet on center. Legends shall include FOAM CONCENTRATE, HIGH EXPANSION FOAM, and FIRE PROTECTION WATER. Legends shall utilize white letters on a red color field and shall include arrows to indicate the direction of flow. Length of color field, letter size and locations on piping shall be as recommended in ANSI A13.1.

3.04 PRELIMINARY TESTS

A. Tests shall be performed to make adjustments in the fire protection system operation and to verify that the system will function as intended and that it is ready for service. Such tests shall include all components and subsystems. Test results shall be clearly documented and included with the written request for Final Test.

1. Flushing: Underground water mains shall be flushed in accordance with NFPA 13 and NFPA 24. This includes the requirement to flush the lead-in connection to the fire protection system at a flow rate not less than the maximum water demand rate of the system.
2. Hydrostatic Tests: The underground and aboveground piping systems, including HEF concentrate, shall be hydrostatically tested in accordance with NFPA 13 at not less than 200 psi, or 50 psi in excess of maximum system operating pressure, for 2 hours. There shall be no visible leakage from the piping when the system is subjected to the hydrostatic test.
3. Automatic Water Control Valves: Each valve shall be tested to verify operation in accordance with manufacturer's published operating instructions. This shall include tests of valves and switches connected thereto.
4. High Expansion Foam Generators: High expansion foam generators shall be discharge tested with foam for proper operation and foam coverage. The Contractor shall position measuring stands throughout the protected area, which are clearly marked at a height of 3.2 feet. Ladders or foam barrels are acceptable as test stands. The design flow of the wet-pipe sprinkler system shall be simulated during foam generator discharge testing. The Contractor shall initiate the HEF discharge with a manual HEF release station. The Contractor shall record the passage of time as the foam is discharged, beginning with the operation of the discharge station. The HEF discharge shall continue until there is a minimum of one meter of foam depth, which must occur within 4 minutes. At that time, the Contractor shall halt the HEF discharge, and record the duration of HEF discharge in minutes and seconds.

5. HEF Concentrate System: Tests shall be conducted under the supervision of a technical representative employed by the HEF concentrate manufacturer. The complete HEF concentrate system shall be adjusted and tested to assure proper operation. Test results, including all pressure settings and readings, shall be recorded on an appropriate test form signed and dated by manufacturer's representative certifying that the system is in compliance with Contract requirements and the manufacturer's recommended practices. Testing shall include, but not be limited to, the following:
   a. Filling the HEF concentrate tank.
   b. Collection of HEF samples and testing with a conductivity meter to verify proportioning accuracy.
   c. Other operational checks recommended by the HEF proportioner manufacturer.
6. Control System Tests: Tests shall be conducted under the supervision of a factory trained representative of the foam system control panel (FSCP) manufacturer. The electrical control system shall be tested to verify that the FSCP and all wiring have been installed correctly and that all components function as intended. Tests shall be conducted using normal operating and battery power. Testing shall include, but not be limited to, each of the following:
   a. Alarm initiating circuit and device. This shall include manual actuation stations, waterflow and pressure switches, and similar devices connected to the FSCP.
   b. Supervisory circuit and device. This shall include valve supervisory (tamper) switches and similar circuits and devices.
   c. Actuation circuit and device. This shall include circuits to automatic water control valves, fire pumps, and similar circuits related to system activation.
   d. Annunciator lamp and notification appliance. This shall include horns, electronic signaling, and similar devices.

3.05 FINAL TEST

A. Requirements: The Final Test shall be a repeat of Preliminary Tests, except that flushing and hydrostatic tests shall not be repeated. In addition, the system shall be automatically actuated and allowed to discharge for a period of at least one minute prior to shutting the system off. The Contractor shall correct system failures and other deficiencies identified during testing and shall retest portions of the system affected by the required corrections.

   1. Pretest Requirements: The system will be considered ready for final testing only after the following have been accomplished:
      a. The required test plan has been submitted and approved.
      b. Preliminary tests have been made and deficiencies determined to have been corrected to the satisfaction of the equipment manufacturer's technical representatives and Owner's Representative.

c. Test reports, including the required videotape of the preliminary tests, have been submitted and approved.
d. The Control Panel and detection systems shall have been in service for a break-in period of at least 14 consecutive days prior to the final test.
e. The Contractor has provided written notification to the Owner's Representative, at least 21 days prior to date of Final Test, that preliminary tests have been successfully completed.

2. Manufacturer's Services: Experienced technicians regularly employed by the Contractor in the installation of the system and manufacturer's representative referred to elsewhere in this specification shall conduct the testing.
3. Materials and Equipment: Contractor shall provide HEF concentrate, gauges, HEF sample collection apparatus, instruments, hose, personnel, elevating platforms, scaffolding, ladders, appliances and any other equipment necessary to fulfill testing requirements specified.
4. Facility and Environmental Protection: Contractor shall provide protection for the facility, including electrical and mechanical equipment exposed to possible damage during discharge tests. This shall include provision of sandbags or similar means for preventing migration of foam solution into adjacent areas. Temporary measures shall be provided to prevent HEF solution from entering storm drains, sanitary sewers, drainage ditches, streams and other water sources. Discharged HEF shall be contained on paved surfaces and shall not be allowed to come in contact with the earth.

B. Control System Tests: Operational features of the Control System shall be tested and demonstrated. This shall include testing of the FSCP and each input and output circuit. Tests of circuits shall include actuation and simulated circuit fault at each initiating, notification, supervisory and actuation device or appliance. As a practical matter, these tests shall be a repeat of preliminary tests required under paragraph "Preliminary Tests."

C. HEF Proportioning System Tests: Each HEF proportioner shall be flow tested to determine that proportioning accuracy is within specified limits. Each proportioner supplying the HEF system shall be tested at the design flow rate. Collecting HEF samples from each proportioner shall be accomplished in accordance with NFPA 11, and the approved test plan. Foam solution concentrations shall be determined using the methods outlined in NFPA 11. Proportioning for nominal 2.75 percent concentrate shall be between 2.75 percent and 3.575 percent, per NFPA 11. If test results indicate proportioning below or above this range, the Contractor shall make necessary adjustments and retest.

D. Post-Discharge Test Requirements: Discharged solution shall be contained and disposed of in a manner acceptable to local authorities and as identified on the approved test plan. Following the successful completion of the tests, the Contractor shall remove the foam solution from the site by allowing the foam bubbles to collapse, the water to evaporate, and the residue to be swept up, and disposed of properly off site. Contractor shall replenish HEF concentrate consumed during the tests. The entire fire protection system shall be returned to automatic operation and the facility restored to operational capability. Once tests are completed, systems shall be returned to fully operational status, including filling of HEF concentrate tank with concentrate as required.

3.06 POSTED INSTRUCTIONS

A. Framed description of system operation, instructions, facility floor plans, and system schematic diagrams of the overall HEF system and each subsystem, based on full-size color "as-built drawings", shall be posted. Condensed operating instructions explaining the system for normal operation, refilling the HEF storage tank, and routine testing shall be included. Posted operation instructions shall be framed in heavy gauge extruded metal frames, mounted under tempered glass, and shall be water and weather-proof.

3.07 TRAINING

A. Contractor shall provide training sessions of at least 4 hours to explain system's operation and maintenance. Training sessions shall include classroom instruction and explanation of approved Operation and Maintenance Manuals. Training aids shall be provided as necessary to clearly describe the systems. In addition to classroom instruction, systems shall be operated to provide hands-on demonstration. Contractor shall include a system actuation using water only, to demonstrate system operation and procedures for resetting the system. Dates and times of the training sessions shall be coordinated with the Owner not less than 15 calendar days prior to the first session.

END OF SECTION

SECTION 15484
DIESEL FUEL TANK SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide two (2) 12,000-gallon cylindrical Aboveground Storage Tank (AST) System and three (3) fueling dispensers, which carries listing and label under U.L. Standard 2085, Insulated Secondary Containment Aboveground Tank for Flammable and Combustible Liquids, Protected Type with Vehicle Impact and Projectile Resistance. The Tank System will provide Emergency Venting for Secondary Containment by Form-of-Construction. Unit must comply with all provisions of U.F.C. 79-7, Appendix A-II-F. The Tank System and its enclosure shall be a completed unit at the factory (shop fabricated).

Move two existing fueling dispensers.

The tank will be used to provide diesel fuel for OTR tractor-trailers, off-road heavy equipment, County vehicles (during emergencies) and a diesel generator. The generator will be remote located and will require a run of underground fuel lines to the generator's fuel tank.

B. Scope of Work

Furnish and install AST including all labor, materials, equipment and incidentals required and perform all associated concrete and piping work as ordered by the Engineer, as shown on the Drawings and as specified herein.

C. Reference Standards

1. American Society for Testing and Materials (ASTM)

a. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

b. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

c. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

d. ASTM C33 - Standard Specification for Concrete Aggregates

e. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

f. ASTM C150 - Standard Specification for Portland Cement.

g. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

2. Underwriter's laboratories (UL)

a. UL-142, Aboveground steel tanks for flammable and combustible liquids.

b. UL-2085, two-hour furnace fire test and two hour simulated pool fire test for insulated and protected tanks

c. UL-2085 and UFC test Standard (Article 79 or APPENDIX #A-11-F-1), for both Vehicle Impact Protection and Projectile Resistance.

d. UL-2085, Protected aboveground tanks for flammable and combustible liquids.

e. UL-2085, Non-metallic secondary containment protected tanks for flammable and combustible liquids with secondary containment emergency venting by "Form of Construction".

3. Certification for Phase I and Phase II Vapor Recovery by the California Air Resources Board (CARB) for gasoline and methanol.

4. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

D. The Contractor's price shall include filling each tank completely prior to system testing.

1.02 QUALITY ASSURANCE

A. Vendor shall provide an AST that meets or exceeds all regulatory statutes.

1.03 SUBMITTALS

A. Submit to the Engineer, in accordance with Section 01340, shop drawings showing the AST system including locations of all penetrations, electrical conduit locations, Piping connections, and accessories.

B. Submit manufacturer's technical product data on all materials and components substantiating that all products comply with requirements. Submit other data specified herein when required.

C. Vendor shall submit samples and/or information on tank finish paint products.

D. Submit a copy of the tank chart to the Engineer and County Project Manager at

the time of the AST completion and prior to final pay application.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All equipment and materials shall be inspected against approved Shop Drawings at time of delivery. Equipment and materials damaged or not meeting requirements of the Approved Shop Drawings shall be immediately returned to the system manufacturer for replacement or repair.

B. Equipment and materials shall be stored in a dry location and protected from the elements according to the system manufacturer's instructions.

C. Equipment and materials shall be handled in an approved manner according to the system manufacturer's instructions

1.05 WARRANTY

A. The Tank System shall have a warranty of 30-years to cover structural leak proof integrity. The Manufacturer agrees to repair any and all defects in materials or workmanship at no additional cost to the County.

B. The pump operation equipment shall be covered for a minimum of one year, excluding filters, hoses, and dispensing nozzles.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers – Subject to compliance with requirements, provide products of the following and/or Equal with proof of acceptability by the State of Florida Department of Environmental Protection.

1. 12,000 Gallon AST -
   Fireguard
2. Fuel Dispenser/Key Control
   Gasboy Model 9840QX-D
   Syn-Tech FuelMaster FMU2500 system with ProKee key control
3. Fuel Gauges,
   Greenleaf Gauge – Solar Gauge model EFG-800-A
4. Sensors, Alarm Switches, Monitoring System
   Pneumercator 3-float LS-600 level sensor switch for detection of low, high, and emergency cut-off levels within the main tank.

   Pneumercator LS-600LD leak detection sensor for the main tank interstitial space.

   Pneumercator ES 825-200F for discriminating dry-sump leak detection.

   Pneumercator TMS-2000 system monitor console with external remote

alarm and display.

All sensors, alarm switches and control consoles to have integral wiring fault detection.

5. Valves, vents, dual-containment pipe, fittings, etc.
   OPW
   Morrison Bros.

6. Dispenser Fittings
   OPW
   Morrison Bros.
   Richardson

7. Fuel Water Filter
   CimTek Hydrasorb II, 70063, 800HS-10 Type 2
   Perfect Filtration Systems

8. Pumps
   Veeder-Root, Red Jacket submersible turbine, 1.5 HP

9. Fuel Hose
   Goodyear Flexsteel, 1.5"

10. Hose Retriever
    Universal Valve Company No. 871 w/ Hosebun 150

B. Tank

1. The tank shall be designed for aboveground storage of flammable and combustible liquids at atmospheric pressure. Tank shall include integral steel secondary containment and thermal insulation that provides a minimum two-hour fire rating.

2. Each tank shall be delivered as a complete UL-listed assembly with two factory supplied, welded-on saddles. Size and location of saddles shall be as required by the manufacturer. Saddles to be set level on a solid foundation.

3. Tank shall comply with National Fire Protection Association NFPA 30 Flammable and Combustible Liquids Code. The tank's secondary containment must be tested for tightness in the factory and in the field before commissioning. Tank shall be supplied with emergency venting for the primary and the secondary containment tanks (emergency venting by "form of construction" will not be permitted).

4. Inner and Outer Tank shall be manufactured in accordance with UL 142 Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids and labeled for Underwriters Laboratories UL 2085 Standard for Insulated Secondary Containment Aboveground Tank for Flammable Liquids. The tank design shall be UL 2085 listed as both "Protected" and

"Fire-Resistant" and tested for Ballistics, Impact, Hose Stream, and Pool Fire UL-2085 performance standards compliance.

5. Tank shall be manufactured and labeled in strict accor-dance with Steel Tank Institute (STI) Fireguard® Thermally Insulated, Double Wall Steel Aboveground Storage Tank standards as applied by a licensee of the STI. Tank shall be subject to the STI's Quality Assurance program and shall be backed by the STI 30 year limited warranty.

6. The tank system shall also meet or exceed the requirements of:
   a. National Fire Protection Association NFPA 30A
   b. Automobile And Marine Service Station Code.
   c. 2000 International Fire Code (IFC)
   d. California Air Resources Board (CARB) testing requirements for air emissions.
   e. Southern Building Code Congress International (SBCCI) Standard Fire Prevention Code.
   f. 1993 Building Officials and Code Administrators (BOCA) National Fire Prevention Code.

7. Tank shall be fabricated per UL-142 and UL-2085 Codes, of mild carbon steel with shell seams of continuous lap weld construction.

8. Tank shall be of double wall construction and provide complete secondary containment of the primary storage tank's contents by an impervious steel outer wall.

9. A minimum of 3" of porous, lightweight monolithic thermal insulation material shall be installed at the factory within the interstitial space between the inner and outer walls. Thermal insulating material:

   a. Shall be in accordance with American Society of Testing Materials (ASTM) Standards C-332 and C-495.
   b. Shall allow liquid to migrate through it to the monitoring point.
   c. Shall not be exposed to weathering and shall be protected by the steel secondary containment outer wall.

10. Lifting lugs shall be provided at balancing points to facilitate handling and installation.

11. Exterior Protective Coating:
   a. Surface Preparation: Grit blast - SSPC-SP-6 Commercial Blast.
   b. Finish: White finish paint system 3-5 DFT on the shell and heads.

12. Threaded fittings with thread protectors shall be supplied as follows (all fittings must be located on tank top per UL):
   a. One (1) 2" - Interstitial Monitoring.
   b. One (1) 2" - Normal Vent, Primary Tank.

c. One (1) 4", 6", or 8" - Emergency Vent, Primary Tank.
d. One (1) 4", 6", or 8" - Emergency Vent, Secondary Tank.
e. One (1) 4", 6" - Product Fill.
f. One (1) 2" - Product Pump or Supply.
g. One (1) 2" - Product Return or Auxiliary.
h. One (1) 2" - Liquid Level Gauge.
i. One (1) 4" - Stage 1 Vapor Recovery, Electronic Level Stage 1 Gauge, or Auxiliary.
j. One (1) 18" Manway (min.) for tanks greater than 4,000 gallons.
k. Additional fittings as shown on the Drawings.

13. Fire Resistance: The Tank System shall be designed and tested to provide 2-hour fire protection for the primary tank as per U.L. 2085 2-hour furnace fire test and 2 hour simulated pool fire test.

14. Bullet Resistance: The primary tank must withstand the U.L./U.L.C. test for ballistics: impact of 5 bullets, (150 grain, M2 balls of ammunition) fired at a muzzle velocity of 2700 feet/second from 100 yards; the primary tank is then pressure tested at 5 psi air pressure to check for leakage.

15. Vehicle Impact Resistance: Unit must withstand U.L./U.L.C. test for impact resistance: unit must be subjected to the impact of an 11,800 pound mass moving at a velocity of 14.7 feet/second; following the impact, the primary tank is then pressure tested to check for leakage.

16. Spill/Overfill Containment: The Tank System shall include a U.L. listed 10-gallon spill/overfill container manufactured as part of a remote fill unit. The spill/overfill container shall include a normally closed valve and hand-pump to dispense spilled product back into the main tank. Exterior steel shall be antioxidant powder coated to inhibit rust.

17. Overfill Protection: Overfill protection shall be provided by the following methods:

a. Direct reading level gauge visible from fill pipe access
b. Valve rated for pressurized delivery located within fill pipe to close automatically at 95% full level
c. Audible/visual high-level alarm.

The 3" fill tube shall incorporate the overfill valve mentioned above, and the discharge point shall be located within 6 inches of the tank bottom. A Morrison Bros. 3" diffuser, model 539AT-0300 AD, shall be used on the fill tube discharge.

18. Signage: Tanks shall be marked on all sides as per state and local codes. Signs will be recessed in concrete exterior to insure against damage during off-loading, refilling or general functions.

19. Anti-Spill Valves: Where product piping extends below the top of the tank, the piping shall include a shutoff valve, fire valve and normally closed safety valve. The safety valve shall be an approved anti-siphon valve or electric solenoid valve.

20. The Tank System shall include 2 bolts for connecting grounding conductors for lightning protection in accordance with NFPA 780.

21. The AST shall be a complete unit provided by a single manufacturer, including necessary accessories, fittings, and equipment.

22. The primary tank shall be pressure tested at the factory to 5 PSIG for 24 to 48 hours, and shall be field-tested by the Contractor to 3 PSIG.

23. The protected and insulated AST system shall have a 2" monitoring port with a thru-tank leak detector tube to allow for physical monitoring capability between the primary tank and secondary containment. This interstitial leak detector shall be a Pneumercator Model LS-600LD and integrated with the Pneumercator system monitor console, model TMS-2000.

24. All openings on the tank shall be from the top only, with threaded NPT risers.

25. The AST shall be equipped with a grade level remote fill box equipped with a 3-inch ball valve, 3-inch entry boot, civacon valve, 3-inch dry disconnect and disconnect cap.

26. The fuel tank shall be equipped with a Greenleaf Solar Gauge, Model EFG-8000-A, with remote display mounted at the remote fill box. The gauge will be used to identify the reserve capacity alarm for the generator and for continuous tank level reading. The reserve capacity alarm shall be adjustable via the Solar Gauge panel to allow for future tonnage increases. This reserve capacity is for emergency use by the generator and transfer trailers.

27. The AST shall be provided with high and low level alarms/cutoffs. The main tank cutoff shall be designed such that the tank will not pump down below the bottom of the pickup tube to prevent the pump running dry.

28. The AST shall be provided with submersible pumps to provide the required flow rates for the fleet fueling and electric generator requirements. Estimated minimum fueling requirements are as follows:

    a. 20 Gallons per minute for fleet fueling.
    b. 60 Gallons per hour for the generator.

29. Fuel transfer pump for generator shall be capable of transferring a minimum 10 GPM via a 1.5" pipe for a minimum distance of 200 feet laterally and +10 feet vertically.

30. The fuel transfer system to the generator day tank shall be interconnected with high/low sensors in the day tank for automated filling. A manual override shall be provided at the day tank area in case of sensor failure. Additional high-level alarms/cutoffs shall be provided at the day tank to override manual filling.

31. The generator sub-base tank system shall include a return line to the main tank in the event of a system fault where the delivery pump continues to run when the day tank is full. The return pump/line shall be rated at or above the supply capacity. Fuel metering devices shall be used on the sub-base tank supply and return lines in order to calculate actual fuel used by the generator.

32. The tanks legs shall be mounted on manufacturer supplied, or recommended, neoprene pads to account for concrete surface irregularities.

    The tank legs shall be anchored to the concrete foundation via manufacturer designed and/or provided anchors.

C. Fuel Dispenser

1. Three dual Gasboy Model No. 9840QX-D high-speed dispensers are required.

2. Pumping shall be provided by an in-tank submersible pump. No pumps shall be installed within the fuel dispenser.

3. Dispenser shall include standard auto shutoff nozzles complete with pulsers, swivels, breakaways, and 12-foot, 1.5-inch diameter hoses.

4. Provide Manufacturer's decals for labeling fuel type.

5. Dispenser shall be installed onto a "Bravo Box", B-8600-1P with float trip assembly, in order for all connections, piping and electrical, to be aboveground.

6. Provide fuel filters and adapters.

7. Dispenser hose shall be supplied with counter-weight type hose retractor and HoseBun hanger as shown in the Drawings.

8. Dispensers shall be capable of withstanding hurricane level winds and 100

year flooding and be capable of operating after such events with minimal maintenance.

9. All equipment requiring painting shall be painted with a fuel resistant primer and finish coat.

D. Fuel Piping

1. All exposed aboveground fuel piping shall be SCH 40 316 stainless steel. The remote fill overflow line may use short sections of flex hose approved for fuel use for ease of installation and to minimize stress on overflow piping from hand-pumping action.

2. All belowground piping shall be dual-contained flexible Pisces, CP15DW 1.5" carrier, by OPW with leak detection transition sumps near the main tank, generator fuel tank and one intermediate location. The dual-wall pipe shall be further contained within 3" OPW carrier pipe, AP-30.

3. All three Pisces transition sumps shall be fitted with Pneumercator discriminating leak detection sensors, model ES 825-200F, and connected to the Pneumercator system monitoring console, model TMS-2000.

4. Fuel supply piping (required for leak containment) between generator and bulk fuel sump shall maintain a minimum 1/8" per foot slope. This will ensure any leaks in the piping will drain towards the leak detectors in the sumps.

5. All flexible fuel piping bends shall maintain a minimum bend radius of 36 inches.

PART 3 - EXECUTION

A. INSTALLATION

1. The tank system including accessories shall be installed in strict accordance with the manufacturer's recommendations and applicable fire and environmental codes. Contractor, prior to installation, shall obtain all required state and local permits.

2. Tanks shall be installed on a reinforced concrete base slab and pedestal designed to support the fully loaded tank. Protective bollards shall be installed per the Drawings and where required by state and local codes. Vendor supplied anti-floatation hold-down straps/anchors shall also be used to secure the tank to the foundation.

3. Tanks shall be marked on all sides with warning signs: "FLAMMABLE" or "COMBUSTIBLE", "NO SMOKING", product identification, and other

signs as required by applicable codes.

4. Electrical work shall be in accordance with applicable codes and shall be rated for hazardous area as required. Electric feed for dispensing pumps shall include an emergency shutoff switch located per code requirements. Tanks shall be electrically grounded in accordance with NFPA 78.

5. The Manufacturer shall deliver the AST directly from the factory to the project site. Delivery date, time and off-load locations are to be coordinated with the Owner and Contractor prior to shipping.

6. The AST system shall be installed and connected with all applicable plumbing, electrical, and other systems as required. The Manufacturer's representative shall supervise the installation and have ultimate authority over the tank installation procedures.

7. The Manufacturer's representative shall be present for all pressure testing and upon actual tank start-up to verify the tank has been installed in strict accordance with the Manufacturer's instructions.

8. Training for safe operation and demonstration of correct operating procedures shall be provided for the County's personnel.

9. Tanks and dispensers shall be equipped with all hardware necessary to be in compliance with Florida Administrative Codes (FACs) 62-761 and 72-763 through December 31, 2009.

B. RELATED WORK

1. All related work to the AST system, including concrete pads, piping, electrical, etc., which may have an effect on the AST system and is performed by the Contractor shall be reviewed by the Manufacturer for conformance to the AST system requirements.

END OF SECTION

Attachment J
Leachate Master Pump Station Capacity Calculations

CITRUS COUNTY TRANSFER STATION AND ASSOCIATED SITE IMPROVEMENTS

Existing Leachate Master Pump Station Capacity Calculations

2008 Maximum Month Total Flow (gallons).	487,594	(August 2008)
Less Surface/Special Project Leachate Directly to Storage Tanks.	(136,004)	gallons
Total Flow for Month:	351,590	gallons
Average Daily Flow (total divided by 30):	11,720	gallons per day
Maximum Day Flow.	47,080	gallons (8/26/08)
Use maximum of Average Daily or Max Day:	47,080	gallons per day
Leachate Flow over 24 hours·	1,962	gallons per hour
Average Gallons per Minute.	32 7	gallons per minute
Existing Leachate Master Pump Station Pump Capacity:	180	gallons per minute
Excess Leachate Master Pump Station Pumping Capacity·	147.3	gallons per minute
Proposed Transfer Station Leachate Pump Station Pumping Rate·	80	gallons per minute
Excess Leachate Master Pump Station Pumping Capacity with Transfer Station Pumps Running:	**67.3**	**gallons per minute**
Alternate Calculation		
Proposed Transfer Station Leachate Generation Rate	167	gallons per day
Average Flow Over 24 hours:	0.12	gallons per minute
Projected Tipping Floor Washdown Flow (one day per week)	5000	gallons
Average Flow over 90 minutes·	55.6	gallons per minute
Total Additional Gallons per Minute to Leachate Master Pump Station	55.7	gallons per minute
Excess Leachate Master Pump Station Pumping Capacity during Transfer Station Tipping Floor Washdown:	**91.6**	**gallons per minute**

CITRUS COUNTY CENTRAL LANDFILL

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
1/1/08	Tue	0 01	0	5843	1287	0	7130	0	6093		6093	
1/2/08	Wed	0 00	11	1224	1734	0	2969	0	6036		6036	
1/3/08	Thu	0 00	1	8704	1362	0	10067	0	5379		5379	
1/4/08	Fri	0 00	0	0	1399	0	1399	0	5521		5521	
1/5/08	Sat	0 00	0	7213	1559	0	8772	0	4801		4801	
1/6/08	Sun	0 00	0	3002	1489	0	4491	0	5748		5748	
1/7/08	Mon	0 00	0	5994	1878	0	7872	0	6279		6279	
1/8/08	Tue	0 00	0	1214	1752	0	2966	0	6473		6473	
1/9/08	Wed	0 00	0	8728	1767	0	10495	0	6275		6275	
1/10/08	Thu	0 00	0	184	1062	0	1246	0	6146		6146	
1/11/08	Fri	0 00	0	9832	2954	0	12786	0	6295		6295	
1/12/08	Sat	0 00	0	6555	976	0	7531	0	6131		6131	
1/13/08	Sun	0 43	0	14017	1219	0	15236	0	6405		6405	
1/14/08	Mon	0 00	0	9300	1235	0	10535	0	6165		6165	
1/15/08	Tue	0 00	0	6432	891	0	7323	0	6014		6014	
1/16/08	Wed	0 97	0	7453	1478	0	8931	0	5525		5525	
1/17/08	Thu	0 01	0	9153	1454	0	10607	0	5231		5231	
1/18/08	Fri	0 02	0	7190	1470	0	8660	0	6737		6737	
1/19/08	Sat	0 69	1	9013	1007	0	10021	0	6514		6514	
1/20/08	Sun	0 00	0	179	1700	0	1879	0	8963		8963	
1/21/08	Mon	0 00	0	10015	1925	0	11940	0	11882		11882	
1/22/08	Tue	1 33	0	9974	2908	0	12882	0	7116		7116	
1/23/08	Wed	0 00	0	7128	2347	0	9475	0	7321		7321	
1/24/08	Thu	0 00	0	8835	2309	0	11144	0	9063		9063	
1/25/08	Fri	0 00	0	3975	1862	0	5837	0	13673		13673	
1/26/08	Sat	0 12	0	10000	2251	0	12251	0	10993		10993	
1/27/08	Sun	0 00	1	6984	1287	0	8272	0	9376		9376	
1/28/08	Mon	0 00	0	8926	1840	0	10766	0	9972		9972	
1/29/08	Tue	0 00	0	3958	1980	0	5938	0	16195		16195	
1/30/08	Wed	0 00	0	7222	1845	0	9067	0	10336		10336	
1/31/08	Thu	0 00	0	8799	1269	0	10068	0	8989		8989	
TOTALS		**3.58**	**14**	**207046**	**51496**	**0**	**258556**	**0**	**237647**	**0**	**237647**	**20909**

0 0 represents No Reading

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

CITRUS COUNTY CENTRAL LANDFILL

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
2/1/08	Fri	0 01	0	4003	1644	0	5647	0	12195	0	12195	
2/2/08	Sat	0 00	0	6303	1955	0	8258	0	13017	0	13017	
2/3/08	Sun	0 00	0	9821	1723	0	11544	0	7698	0	7698	
2/4/08	Mon	0 00	0	195	2143	0	2338	0	8422	0	8422	
2/5/08	Tue	0 00	0	10233	2322	0	12555	0	10299	0	10299	
2/6/08	Wed	0 00	0	7263	2038	0	9301	0	13424	0	13424	
2/7/08	Thu	0 24	0	2879	1529	0	4408	0	8096	0	8096	
2/8/08	Fri	0 00	0	5929	1612	0	7541	0	8297	0	8297	
2/9/08	Sat	0 00	0	12190	1899	0	14089	0	9785	0	9785	
2/10/08	Sun	0 00	0	174	1403	0	1577	0	6941	0	6941	
2/11/08	Mon	0 00	0	1218	1496	0	2714	0	7227	0	7227	
2/12/08	Tue	1 64	0	4026	1373	0	5399	0	11602	0	11602	
2/13/08	Wed	0 01	5	16142	2029	0	18176	0	8587	0	8587	
2/14/08	Thu	0 00	0	1025	1985	0	3010	0	6828	0	6828	
2/15/08	Fri	0 00	0	9976	2333	0	12309	0	7201	0	7201	
2/16/08	Sat	0 00	0	6986	1666	0	8652	0	7435	0	7435	
2/17/08	Sun	0 00	0	8143	2101	0	10244	0	6902	0	6902	
2/18/08	Mon	0 09	0	8653	2051	0	10704	0	7323	0	7323	
2/19/08	Tue	0 00	0	253	2035	0	2288	0	7606	0	7606	
2/20/08	Wed	0 00	10	3195	1944	0	5149	0	7684	0	7684	
2/21/08	Thu	0 10	0	6964	1779	0	8743	0	6305	0	6305	
2/22/08	Fri	0 95	0	9243	2131	0	11374	0	6300	0	6300	
2/23/08	Sat	0 02	0	8907	2129	0	11036	0	7165	0	7165	
2/24/08	Sun	0 43	0	6039	2101	0	8140	0	7015	0	7015	
2/25/08	Mon	0 01	5	7952	2579	0	10536	0	7615	0	7615	
2/26/08	Tue	0 00	1	7525	2661	0	10187	0	7567	0	7567	
2/27/08	Wed	0 00	0	1193	2348	0	3541	0	8422	0	8422	
2/28/08	Thu	0 00	0	3036	2405	0	5441	0	8149	0	8149	
2/29/08	Fri	0 00	0	10011	1968	0	11979	0	8370	0	8370	
TOTALS		**3.50**	**21**	**179477**	**57382**	**0**	**236880**	**0**	**243477**	**0**	**243477**	**-6597**

0 0 represents No Reading

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

CITRUS COUNTY CENTRAL LANDFILL

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
3/1/08	Sat	0 00	0	6134	2187	0	8321	0	11581		11581	
3/2/08	Sun	0 00	0	9863	1627	0	11490	0	13930		13930	
3/3/08	Mon	0 00	0	1140	2321	0	3461	0	9168		9168	
3/4/08	Tue	0 20	0	8842	2390	0	11232	0	9611		9611	
3/5/08	Wed	0 00	0	8235	1034	0	9269	0	13459 0		13459	
3/6/08	Thu	0 40	0	5801	2128	0	7929	0	13627 0		13627	
3/7/08	Fri	3 40	0	9285	7473	0	16758	0	10529 0		10529	
3/8/08	Sat	0 00	0	0	2113	0	2113	0	9818		9818	
3/9/08	Sun	0 00	0	11404	2113	0	13517	0	9819		9819	
3/10/08	Mon	0 00	0	9929	2457	0	12386	0	12860		12860	
3/11/08	Tue	0 00	0	8994	2528	0	11522	0	13212		13212	
3/12/08	Wed	0 00	0	190	1831	0	2021	0	10447 0		10447	
3/13/08	Thu	0 00	0	9930	2243	0	12173	0	0		0	
3/14/08	Fri	0 40	1	9857	3856	0	13714	0	16357		16357	
3/15/08	Sat	0 00	0	2863	2493	0	5356	0	8370		8370	
3/16/08	Sun	0 00	0	7051	1903	0	8954	0	7061		0	
3/17/08	Mon	0 00	0	5518	2717	0	8235	0	16533		7061	
3/18/08	Tue	0 00	0	9693	2210	0	11903	0	7024		16533	
3/19/08	Wed	0 48	0	2909	2405	0	5314	0	7780 0		7024	
3/20/08	Thu	0 00	0	6159	2031	0	8190	0	7286		7780	
3/21/08	Fri	0 00	0	9735	2442	0	12177	0	7629		7286	
3/22/08	Sat	0 08	0	1470	2520	0	3990	0	9102		7629	
3/23/08	Sun	0 00	0	8386	2257	0	10643	0	7809		9102	
3/24/08	Mon	0 00	0	6002	2301	0	8303	0	7558		7809	
3/25/08	Tue	0 00	0	1145	2089	0	3234	0	7246		7558	
3/26/08	Wed	0 00	0	8344	698	0	9042	0	7167 0		7246	
3/27/08	Thu	0 00	0	1147	1714	0	2861	0	7345		7167	
3/28/08	Fri	0 00	0	9773	2410	0	12183	0	7544		7345	
3/29/08	Sat	0 00	1	5199	2167	0	7367	0	7255		7544	
3/30/08	Sun	0 00	0	3662	327	0	3989	0	7380		7255	
3/31/08	Mon	0 00	0	8692	3594	0	12286	0			7380	
TOTALS		**4.96**	**2**	**197352**	**72579**	**0**	**269933**	**0**	**284507**	**0**	**284507**	**-14574**

0 0 represents No Reading

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
4/1/08	Tue	0 00	0	7020	1762	0	8782	0	7746		7746	
4/2/08	Wed	0 00	0	9056	1118	0	10174	0	7466		7466	
4/3/08	Thu	0 17	0	167	2345	0	2512	0	7032		7032	
4/4/08	Fri	0 88	0	10197	2067	0	12264	0	6355		6355	
4/5/08	Sat	1 40	0	6267	2149	0	8416	0	8882		8882	
4/6/08	Sun	0 94	0	3898	2085	0	5983	0	7030		7030	
4/7/08	Mon	0 00	0	6298	2100	0	8398	0	6804		6804	
4/8/08	Tue	0 00	1	8466	2315	0	10782	0	7915		7915	
4/9/08	Wed	0 00	0	6667	1427	0	8094	0	8181		8181	
4/10/08	Thu	0 00	0	2889	1533	0	4422	0	8225		8225	
4/11/08	Fri	0 00	0	3887	2079	0	5966	0	5229		5229	
4/12/08	Sat	0 03	0	7507	1279	0	8786	0	12984		12984	
4/13/08	Sun	0 00	0	10311	2140	0	12451	0	0		0	
4/14/08	Mon	0 00	0	6384	1078	0	7462	0	0		0	
4/15/08	Tue	0 00	0	10142	1143	0	11285	0	5760		5760	
4/16/08	Wed	0 00	0	84	344	7082	7510	0	5817		5817	
4/17/08	Thu	0 00	0	7082	840	0	7922	0	0		0	
4/18/08	Fri	0 00	0	8826	844	0	9670	0	8431		8431	
4/19/08	Sat	0 00	0	1056	901	0	1957	0	6821		6821	
4/20/08	Sun	0 00	1	8906	810	0	9717	0	6864		6864	
4/21/08	Mon	0 00	0	6885	957	0	7842	0	6208		6208	
4/22/08	Tue	0 00	0	7866	1746	0	9612	0	6836		6836	
4/23/08	Wed	0 00	0	111	1001	0	1112	0	6713		6713	
4/24/08	Thu	0 00	0	5170	1046	0	6216	0	6607		6607	
4/25/08	Fri	0 00	0	6173	1125	0	7298	0	6732		6732	
4/26/08	Sat	0 00	0	92	1144	0	1236	0	6594		6594	
4/27/08	Sun	0 00	0	10836	891	0	11727	0	8847		8847	
4/28/08	Mon	0 13	0	9880	996	0	10876	0	8982		8982	
4/29/08	Tue	0 00	0	136	880	0	1016	0	9002		9002	
4/30/08	Wed	0 00	0	1118	2127	0	3245	0	8899		8899	
Unmetered effluent flow for the month											**29518**	
TOTALS		**3.55**	**2**	**173377**	**42272**	**7082**	**222733**	**0**	**202962**	**0**	**232480**	**-9747**

0 0 represents No Reading

PHASE 1 & 1A TOTAL ACRES 19 1 - 1 2 OPEN, 15 8 INTERMEDIATE, 2 1 UNUSED, 0 0 CLOSED

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

Leachate Treatment plant cleaning 4/16 - 4/18 & 4/30/08 Effluent included in unmetered total and plant re-seeding indicated under Special Project

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
5/1/08	Thu	0 00	0	3184	1657	0	4841	0	4161		4161	
5/2/08	Fri	0 00	0	1107	3493	0	4600	0	10261		10261	
5/3/08	Sat	0 00	0	9170	2223	0	11393	0	11966		11966	
5/4/08	Sun	0 00	0	6728	1973	0	8701	0	8849		8849	
5/5/08	Mon	0 00	0	7124	1749	0	8873	0	8733		8733	
5/6/08	Tue	0 00	0	2896	1695	0	4591	0	9058		9058	
5/7/08	Wed	0 00	0	6224	2023	0	8247	0	8322		8322	
5/8/08	Thu	0 00	0	10009	2198	0	12207	0	8662		8662	
5/9/08	Fri	0 00	0	119	1737	0	1856	0	7867		7867	
5/10/08	Sat	0 00	0	6193	1850	0	8043	0	8776		8776	
5/11/08	Sun	0 00	0	9827	6338	0	16165	0	8359		8359	
5/12/08	Mon	0 00	0	139	1138	0	1277	0	8443		8443	
5/13/08	Tue	0 00	0	5708	2128	0	7836	0	8370		8370	
5/14/08	Wed	0 00	0	6704	2018	0	8722	0	8273		8273	
5/15/08	Thu	0 00	0	2885	2450	0	5335	0	7901		7901	
5/16/08	Fri	0 00	0	6193	1472	0	7665	0	8882		8882	
5/17/08	Sat	0 00	0	7152	1721	0	8873	0	8068		8068	
5/18/08	Sun	0 00	2	2861	1799	0	4662	0	8776		8776	
5/19/08	Mon	0 00	0	6166	1730	0	7896	0	8573		8573	
5/20/08	Tue	0 00	0	7182	2060	0	9242	0	8067		8067	
5/21/08	Wed	0 00	1	2819	1674	0	4494	0	8700		8700	
5/22/08	Thu	**0.04**	0	6104	1297	0	7401	0	6986		6986	
5/23/08	Fri	0 00	0	1135	1469	0	2604	0	7205		7205	
5/24/08	Sat	0 00	0	8911	1349	0	10260	0	7175		7175	
5/25/08	Sun	0 00	0	0	1360	0	1360	0	7759		7759	
5/26/08	Mon	0 00	154	6245	1480	0	7879	0	8203		8203	
5/27/08	Tue	0 00	0	7168	1140	0	8308	0	0		0	
5/28/08	Wed	0 00	0	4387	1460	0	5847	0	7891		7891	
5/29/08	Thu	0 00	0	4119	1320	0	5439	0	7965		7965	
5/30/08	Fri	0 00	1	7151	901	0	8053	0	8120		8120	
5/31/08	Sat	0 00	0	8737	1322	0	10059	0	6925		6925	
TOTALS		**0.04**	**158**	**164347**	**58224**	**0**	**222729**	**0**	**247296**	**0**	**247296**	**-24567**

0 0 represents No Reading

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

CITRUS COUNTY CENTRAL LANDFILL

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
6/1/08	Sun	0 00	0	101	917	0	1018	0	7123		7123	
6/2/08	Mon	0 00	0	143	1242	0	1385	0	8091		8091	
6/3/08	Tue	0 00	0	7249	2923	0	10172	0	7444		7444	
6/4/08	Wed	0 00	0	9348	1808	0	11156	0	8344		8344	
6/5/08	Thu	0 00	0	128	1939	0	2067	0	6148		6148	
6/6/08	Fri	0 00	0	6546	1865	0	8411	0	5697		5697	
6/7/08	Sat	0 00	0	6926	1911	0	8837	0	5551		5551	
6/8/08	Sun	0 07	0	2857	1564	0	4421	0	6285		6285	
6/9/08	Mon	0 14	0	6200	808	0	7008	0	5865		5865	
6/10/08	Tue	0 02	0	169	1432	0	1601	0	6472		6472	
6/11/08	Wed	0 00	0	7176	907	0	8083	0	6773		6773	
6/12/08	Thu	0 90	0	8928	1954	0	10882	0	6863		6863	
6/13/08	Fri	0 26	0	129	1733	0	1862	0	6962		6962	
6/14/08	Sat	0 56	0	7141	2076	0	9217	0	6174		6174	
6/15/08	Sun	2 31	0	4451	3826	0	8277	0	7598		7598	
6/16/08	Mon	0 58	1	8493	1172	0	9666	0	7841		7841	
6/17/08	Tue	0 03	56	7113	996	0	8165	0	8016		8016	
6/18/08	Wed	0 97	0	3285	1908	0	5193	0	8423		8423	
6/19/08	Thu	0 00	0	9370	947	0	10317	0	7985		7985	
6/20/08	Fri	0 00	3	5961	632	0	6596	0	14101		14101	
6/21/08	Sat	1 08	0	3898	1661	0	5559	0	11580		11580	
6/22/08	Sun	0 24	0	9808	2503	0	12311	0	7605		7605	
6/23/08	Mon	0 00	0	5896	4062	0	9958	0	6168		6168	
6/24/08	Tue	0 00	0	3873	5734	0	9607	0	6260		6260	
6/25/08	Wed	0 80	0	6524	2086	0	8610	0	6042		6042	
6/26/08	Thu	3 00	2	13790	8565	0	22357	0	9668		9668	
6/27/08	Fri	0 00	4	15564	1069	0	16637	0	9869		9869	
6/28/08	Sat	0 00	5	52949	1366	0	54320	0	8133		8133	
6/29/08	Sun	0 00	2	20190	1648	0	21840	0	7393		7393	
6/30/08	Mon	0 00	0	9087	1077	0	10164	0	7634		7634	
TOTALS		**10.96**	**73**	**243293**	**62331**	**0**	**305697**	**0**	**228108**	**0**	**228108**	**77589**

0 0 represents No Reading

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
7/1/08	Tue	0 00	0	4023	1390	0	5413	0	7871		7871	
7/2/08	Wed	0 17	0	12306	687	0	12993	0	7595		7595	
7/3/08	Thu	0 00	2	8083	1025	0	9110	0	4748		4748	
7/4/08	Fri	0 31	0	1136	1269	0	2405	0	11797		11797	
7/5/08	Sat	0 00	0	5175	984	0	6159	0	4622		4622	
7/6/08	Sun	0 34	0	3129	1502	0	4631	0	11037		11037	
7/7/08	Mon	0 88	2	5749	4239	0	9990	0	8528		8528	
7/8/08	Tue	0 23	1	6330	1222	0	7553	0	9185		9185	
7/9/08	Wed	0 00	1	8194	709	0	8904	0	7151		7151	
7/10/08	Thu	0 00	5	5320	684	0	6009	0	8793		8793	
7/11/08	Fri	0 00	8	2516	196	0	2720	0	7939		7939	
7/12/08	Sat	0 14	0	14	439	0	453	0	7255		7255	
7/13/08	Sun	1 62	7	8619	4250	0	12876	0	8895		8895	
7/14/08	Mon	0 15	165	10789	2765	0	13719	0	9122		9122	
7/15/08	Tue	0 18	2	7968	2294	0	10264	0	8059		8059	
7/16/08	Wed	0 20	4	7792	1458	0	9254	0	7786		7786	
7/17/08	Thu	0 20	1	5892	1134	0	7027	0	7903		7903	
7/18/08	Fri	0 00	0	6253	4508	0	10761	0	7463		7463	
7/19/08	Sat	0 00	0	4185	891	0	5076	0	7824		7824	
7/20/08	Sun	0 00	5	7053	666	0	7724	0	7718		7718	
7/21/08	Mon	0 00	8	6972	1785	0	8765	0	7681		7681	
7/22/08	Tue	0 00	2	346	296	0	644	0	7974		7974	
7/23/08	Wed	0 00	0	7067	0	0	7067	0	7810		7810	
7/24/08	Thu	0 00	0	3621	0	0	3621	0	7418		7418	
7/25/08	Fri	0 20	1	10778	872	0	11651	0	7749		7749	
7/26/08	Sat	0 00	1	71	827	0	899	0	7697		7697	
7/27/08	Sun	0 00	0	497	1018	0	1515	0	7973		7973	
7/28/08	Mon	0 08	0	8669	0	0	8669	0	8375		8375	
7/29/08	Tue	0 00	0	1102	1394	0	2496	0	8295		8295	
7/30/08	Wed	0 00	0	4542	2051	0	6593	0	8062		8062	
7/31/08	Thu	0 42	0	2679	909	0	3588	0	8453		8453	
TOTALS		**5.12**	**215**	**166870**	**41464**	**0**	**208549**	**0**	**248778**	**0**	**248778**	**-40229**

0 0 represents No Reading

7/08- 7 Acre east lift station out of service due to power outage at site Running pumps with generator as needed

7/3/08- 80 Acre Primary Level transducers out of service Running pumps in manual when needed

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
8/1/08	Fri	0 20	142	6770	2042	0	8954	0	8138		8138	
8/2/08	Sat	0 60	0	833	1535	0	2368	0	4101		4101	
8/3/08	Sun	0 00	180	462	1079	0	1721	0	12940		12940	
8/4/08	Mon	0 01	2	9740	702	0	10444	0	8123		8123	
8/5/08	Tue	0 00	2	5560	4036	0	9598	0	8094		8094	
8/6/08	Wed	0 02	176	9301	1875	0	11352	0	8507		8507	
8/7/08	Thu	0 00	0	4346	1440	0	5786	0	8351		8351	
8/8/08	Fri	0 25	0	931	1227	0	2158	0	7863		7863	
8/9/08	Sat	0 00	141	4517	899	0	5557	0	8673		8673	
8/10/08	Sun	0 00	0	58	639	0	697	0	7910		7910	
8/11/08	Mon	0 00	154	10036	2309	0	12499	0	7742		7742	
8/12/08	Tue	0 36	0	5542	3325	0	8867	0	7127		7127	
8/13/08	Wed	0 74	174	3796	1243	0	5213	0	7441		7441	
8/14/08	Thu	2 11	0	10165	1201	0	11366	0	6945		6945	
8/15/08	Fri	0 05	0	5103	1530	0	6633	0	6931		6931	
8/16/08	Sat	0 00	169	4522	968	0	5659	0	6781		6781	
8/17/08	Sun	0 00	1	3014	1330	0	4345	0	6225		6225	
8/18/08	Mon	0 34	0	20844	2049	0	22893	0	9155		9155	
8/19/08	Tue	0 20	0	5046	5112	0	10158	0	3908		3908	
8/20/08	Wed	0 02	161	18993	3065	0	22219	0	8050		8050	
8/21/08	Thu	3 16	1	4097	4120	0	8218	0	8763		8763	
8/22/08	Fri	4 00	2	8272	6705	97788	112767	0	0		0	
8/23/08	Sat	0 30	168	12419	4645	11240	28472	0	0		0	
8/24/08	Sun	1 40	0	12054	4138	0	16192	0	0		0	
8/25/08	Mon	0 70	157	113	3419	26976	30665	24549	22638		47187	
8/26/08	Tue	0 00	10	44295	2775	0	47080	51858	11861		63719	
8/27/08	Wed	0 00	1	16824	5961	0	22786	35000	11889		46889	
8/28/08	Thu	0 00	4	8333	2803	0	11140	0	17025		17025	
8/29/08	Fri	0 00	4	17340	1144	0	18488	0	12018		12018	
8/30/08	Sat	0 61	0	10250	1987	0	12237	0	12236		12236	
8/31/08	Sun	0 00	0	9105	1957	0	11062	0	19824		19824	
TOTALS		**15.07**	**1649**	**272681**	**77260**	**136004**	**487594**	**111407**	**269259**	**0**	**380666**	**106928**

0 0 represents No Reading

7/08- 7 Acre east lift station operating pumps with generator as needed due to power outage at site

8/22-23-25/08- Manually pumped 136,004 gallons of leachate out of phase II cell back to storage tanks due to rains from Tropical Storm Faye

8/27/08- Primary pump #2 for 80 acre cell out of service

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
9/1/08	Mon	0 00	0	9160	4351	0	13511	0	10761		10761	
9/2/08	Tue	0 05	1	8262	1547	0	9810	0	10513		10513	
9/3/08	Wed	0 00	0	9218	1264 0	0	10482	0	20791		20791	
9/4/08	Thu	0 00	0	9203	1273	0	10476	0	10332		10332	
9/5/08	Fri	0 00	0	9188	5604	0	14792	0	16814		16814	
9/6/08	Sat	0 00	0	5181	961	0	6142	0	14892		14892	
9/7/08	Sun	0 00	164	7476	925	0	8565	0	15863		15863	
9/8/08	Mon	0 00	4	6382	1197	0	7583	0	5423		5423	
9/9/08	Tue	0 00	17	8178	4915	0	13110	0	20409		20409	
9/10/08	Wed	0 44	1	7413	3116	0	10530	0	15607		15607	
9/11/08	Thu	0 00	0	6692	1371	0	8063	0	19428		19428	
9/12/08	Fri	0 00	0	6433	682	0	7115	0	15731		15731	
9/13/08	Sat	0 00	4	9240	981	0	10225	0	15047		15047	
9/14/08	Sun	0 00	2	5013	945	0	5960	0	9231		9231	
9/15/08	Mon	0 00	2	7596	980	0	8578	0	0		0	
9/16/08	Tue	0 00	2	5192	5146	0	10340	0	32641		32641	
9/17/08	Wed	0 00	1	7493	3087	0	10581	0	14119		14119	
9/18/08	Thu	0 00	4	5179	2949	0	8132	0	11504		11504	
9/19/08	Fri	0 00	0	7426	2364	0	9790	0	16494		16494	
9/20/08	Sat	0 00	0	5272	677	0	5949	0	15359		15359	
9/21/08	Sun	2 90	2	7596	2471	0	10069	0	11376		11376	
9/22/08	Mon	0 00	0	9199	998	0	10197	0	13247		13247	
9/23/08	Tue	0 00	0	7565	1355	0	8920	0	18226		18226	
9/24/08	Wed	0 00	0	9167	629	0	9796	0	12212		12212	
9/25/08	Thu	0 00	1	6059	969	0	7029	0	9750		9750	
9/26/08	Fri	0 00	0	6496	731	0	7227	0	9880		9880	
9/27/08	Sat	0 00	0	9262	701	0	9963	0	9705		9705	
9/28/08	Sun	0 00	0	3477	963	0	4440	0	9853		9853	
9/29/08	Mon	0 06	0	9136	5783	0	14919	0	9375		9375	
9/30/08	Tue	0 00	0	6155	3167	0	9322	0	10541		10541	
TOTALS		**3.45**	**205**	**219309**	**62102**	**0**	**281616**	**0**	**405124**	**0**	**405124**	**-123508**

0 0 represents No Reading

8/27/08- Primary pump #2 for 80 acre cell out of service

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
10/1/08	Wed	0 00	0	6571	694	0	7265	0	7767		7767	
10/2/08	Thu	0 00	0	4424	3917	0	8341	0	8190		8190	
10/3/08	Fri	0 00	0	8303	686	0	8989	0	8307		8307	
10/4/08	Sat	0 00	0	3472	659	0	4131	0	6563		6563	
10/5/08	Sun	0 00	0	9163	934	0	10097	0	6362		6362	
10/6/08	Mon	0 80	0	3408	5112	0	8520	0	6799		6799	
10/7/08	Tue	0 09	1	9133	2724	0	11858	0	7133		7133	
10/8/08	Wed	0 00	1	5154	3002	0	8157	0	7241		7241	
10/9/08	Thu	0 00	0	7309	2360	0	9669	0	6449		6449	
10/10/08	Fri	0 00	0	5184	2628	0	7812	0	8248		8248	
10/11/08	Sat	0 00	0	7433	751	0	8184	0	8588		8588	
10/12/08	Sun	0 00	0	5145	2243	0	7388	0	8622		8622	
10/13/08	Mon	0 00	0	4347	738	0	5085	0	8799		8799	
10/14/08	Tue	0 00	0	8296	742	0	9038	0	8100		8100	
10/15/08	Wed	0 00	0	3408	4554	0	7962	0	8354		8354	
10/16/08	Thu	0 00	1	9186	2667	0	11854	0	8324		8324	
10/17/08	Fri	0 00	0	3469	2750	0	6219	0	8629		8629	
10/18/08	Sat	0 10	0	6038	336	0	6374	0	7245		7245	
10/19/08	Sun	0 00	0	6636	692	0	7328	0	5898		5898	
10/20/08	Mon	0 00	0	3669	4014	0	7683	0	5435		5435	
10/21/08	Tue	0 00	0	8045	2521	0	10566	0	7984		7984	
10/22/08	Wed	0 00	0	5190	2584	0	7774	0	8498		8498	
10/23/08	Thu	0 51	0	4271	2466	0	6737	0	8384		8384	
10/24/08	Fri	0 01	0	7748	2694	0	10442	0	9258		9258	
10/25/08	Sat	0 00	0	6531	754	0	7285	0	8337		8337	
10/26/08	Sun	0 00	0	6619	694	0	7313	0	8830		8830	
10/27/08	Mon	0 00	0	3492	4124	0	7616	0	8514		8514	
10/28/08	Tue	0 00	16	4329	2301	0	6646	0	8345		8345	
10/29/08	Wed	0 00	155	8258	725	0	9138	0	8201		8201	
10/30/08	Thu	0 00	0	4664	2431	0	7095	0	14038		14038	
10/31/99	Sun	0 00	0	2117	360	0	2477	0	10844		10844	
TOTALS		**1.51**	**174**	**181012**	**63857**	**0**	**245043**	**0**	**252286**	**0**	**252286**	**-7243**

0 0 represents No Reading

8/27/08- Primary pump #2 for 80 acre cell out of service

10/23/2008 - Hosed down and cleaned out 2000 gallons of sand and spent carbon from the south side leachate storage tank and disposed of in cell

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
11/1/08	Sat	0 00	0	9789	697	0	10486	0	8869		8869	[illegible]
11/2/08	Sun	0 00	0	3398	369	0	3767	0	14291		14291	[illegible]
11/3/08	Mon	0 00	0	8778	705	0	9483	0	10922		10922	[illegible]
11/4/08	Tue	0 00	0	5382	731	0	6113	0	7858		7858	[illegible]
11/5/08	Wed	0 00	0	3310	4746	0	8056	0	7713		7713	[illegible]
11/6/08	Thu	0 00	0	9099	3055	0	12154	0	8612		8612	[illegible]
11/7/08	Fri	0 00	0	3303	2908	0	6211	0	6881		6881	[illegible]
11/8/08	Sat	0 00	0	5132	723	0	5855	0	8753		8753	[illegible]
11/9/08	Sun	0 00	0	4310	372	0	4682	0	6242		6242	[illegible]
11/10/08	Mon	0 00	0	8251	4662	0	12913	0	6077		6077	[illegible]
11/11/08	Tue	0 00	0	3413	352	0	3765	0	5157		5157	[illegible]
11/12/08	Wed	0 00	0	5907	3329	0	9236	0	5414		5414	[illegible]
11/13/08	Thu	0 03	1	6446	2042	0	8489	0	8380		8380	[illegible]
11/14/08	Fri	0 00	0	5050	2900	0	7950	0	8815		8815	[illegible]
11/15/08	Sat	0 00	0	3469	679	0	4148	0	8372		8372	[illegible]
11/16/08	Sun	0 00	10	4348	350	0	4708	0	8760		8760	[illegible]
11/17/08	Mon	0 00	0	8272	3460	0	11732	0	8552		8552	[illegible]
11/18/08	Tue	0 00	0	3395	2234	0	5629	0	8205		8205	[illegible]
11/19/08	Wed	0 00	47	5126	2815	0	7988	0	4878		4878	[illegible]
11/20/08	Thu	0 00	0	7352	3092	0	10444	0	12624		12624	[illegible]
11/21/08	Fri	0 00	6	3423	1163	0	4592	0	6451		6451	[illegible]
11/22/08	Sat	0 00	153	5155	646	0	5954	0	5597		5597	[illegible]
11/23/08	Sun	0 00	0	4392	559	0	4951	0	5197		5197	[illegible]
11/24/08	Mon	0 00	99	8404	768	0	9271	0	5525		5525	[illegible]
11/25/08	Tue	0 09	2	3439	6306	0	9747	0	5113		5113	[illegible]
11/26/08	Wed	0 79	0	0	0	0	0	0	3048		3048	[illegible]
11/27/08	Thu	0 00	7	12718	2270	0	14995	0	5865		5865	[illegible]
11/28/08	Fri	0 00	0	5031	934	0	5965	0	4083		4083	[illegible]
11/29/08	Sat	0 00	0	5059	428	0	5487	0	0		0	[illegible]
11/30/08	Sun	0 00	0	9001	1535	0	10536	0	0		0	[illegible]
TOTALS		**0.91**	**325**	**170152**	**54830**	**0**	**225307**	**0**	**206254**	**0**	**206254**	**19053**

0 0 represents No Reading

8/27/08- Primary pump #2 for 80 acre cell out of service

PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 8 INTERMEDIATE, 1 3 UNUSED, 0 0 CLOSED

DAILY GALLONS LEACHATE GENERATED, DISPOSED AND PRECIPITATION DATA

DATE	DAY	RAIN DATA	80-ACRE TOTAL SECONDARY PHASE 1, 1A & 2	80-ACRE TOTAL PRIMARY PHASE 1, 1A & 2	7 ACRE LEACHATE FLOW	SURFACE LEACHATE OR SPECIAL PROJECT	**TOTAL LEACHATE GENERATED**	LEACHATE (RAW) DISPOSAL OFF-SITE TO BW WWTP	LEACHATE EFFLUENT DISPOSAL ON-SITE	LEACHATE EFFLUENT DISPOSAL OFF-SITE	**TOTAL LEACHATE DISPOSAL**	BALANCE
12/1/06	Fri	0 25	0	1676	5591	0	7267	0	6621		6621	
12/2/06	Sat	0 00	10	3425	3058	0	6493	0	7995		7995	
12/3/06	Sun	0 00	0	6039	3125	0	9164	0	7888		7888	
12/4/06	Mon	0 00	0	6538	1476	0	8014	0	0		0	
12/5/06	Tue	0 02	0	5032	1868	5837	12737	0	0		0	
12/6/06	Wed	0 00	0	4309	1649	0	5958	0	0		0	
12/7/06	Thu	0 00	0	3375	823	0	4198	0	0		0	
12/8/06	Fri	0 00	26	4823	679	7216	12744	0	0		0	
12/9/06	Sat	0 00	0	4818	6643	0	11461	0	0		0	
12/10/06	Sun	0 00	0	7625	283	0	7908	0	0		0	
12/11/06	Mon	0 40	0	4615	13386	8254	26255	0	8199		8199	
12/12/06	Tue	0 00	0	3371	3598	0	6969	0	17486		17486	
12/13/06	Wed	0 00	0	3378	506	0	3884	0	9889		9889	
12/14/06	Thu	0 00	0	7304	760	0	8064	0	11284		11284	
12/15/06	Fri	0 00	0	3208	3207	0	6415	0	10535		10535	
12/16/06	Sat	0 00	7	4829	692	0	5528	0	17732		17732	
12/17/06	Sun	0 00	0	3205	2367	0	5572	0	13612		13612	
12/18/06	Mon	0 00	0	5688	328	0	6016	0	9564		9564	
12/19/06	Tue	0 00	0	6323	2398	0	8721	0	9895		9895	
12/20/06	Wed	0 00	0	4821	618	0	5439	0	9748		9748	
12/21/06	Thu	0 09	0	3209	319	0	3528	0	10048		10048	
12/22/06	Fri	0 00	1	3251	3237	0	6489	0	9259		9259	
12/23/06	Sat	0 00	0	4058	2089	0	6147	0	8244		8244	
12/24/06	Sun	0 00	0	7967	1345	0	9312	0	7697		7697	
12/25/06	Mon	0 00	0	3304	558	0	3862	0	8056		8056	
12/26/06	Tue	0 00	0	3281	264	0	3545	0	7244		7244	
12/27/06	Wed	0 00	0	5811	380	0	6191	0	6308		6308	
12/28/06	Thu	0 00	0	6413	396	0	6809	0	7466		7466	
12/29/06	Fri	0 00	0	4916	3919	0	8835	0	3		3	
12/30/06	Sat	0 00	0	3318	1991	0	5309	0	13415		13415	
12/31/06	Sun	0 00	0	5868	2169	0	8037	0	7447		7447	
Unmetered 12/11/08									8199		8199	
TOTALS		**0.76**	**44**	**145798**	**69722**	**21307**	**236871**	**0**	**233834**	**0**	**233834**	**3037**

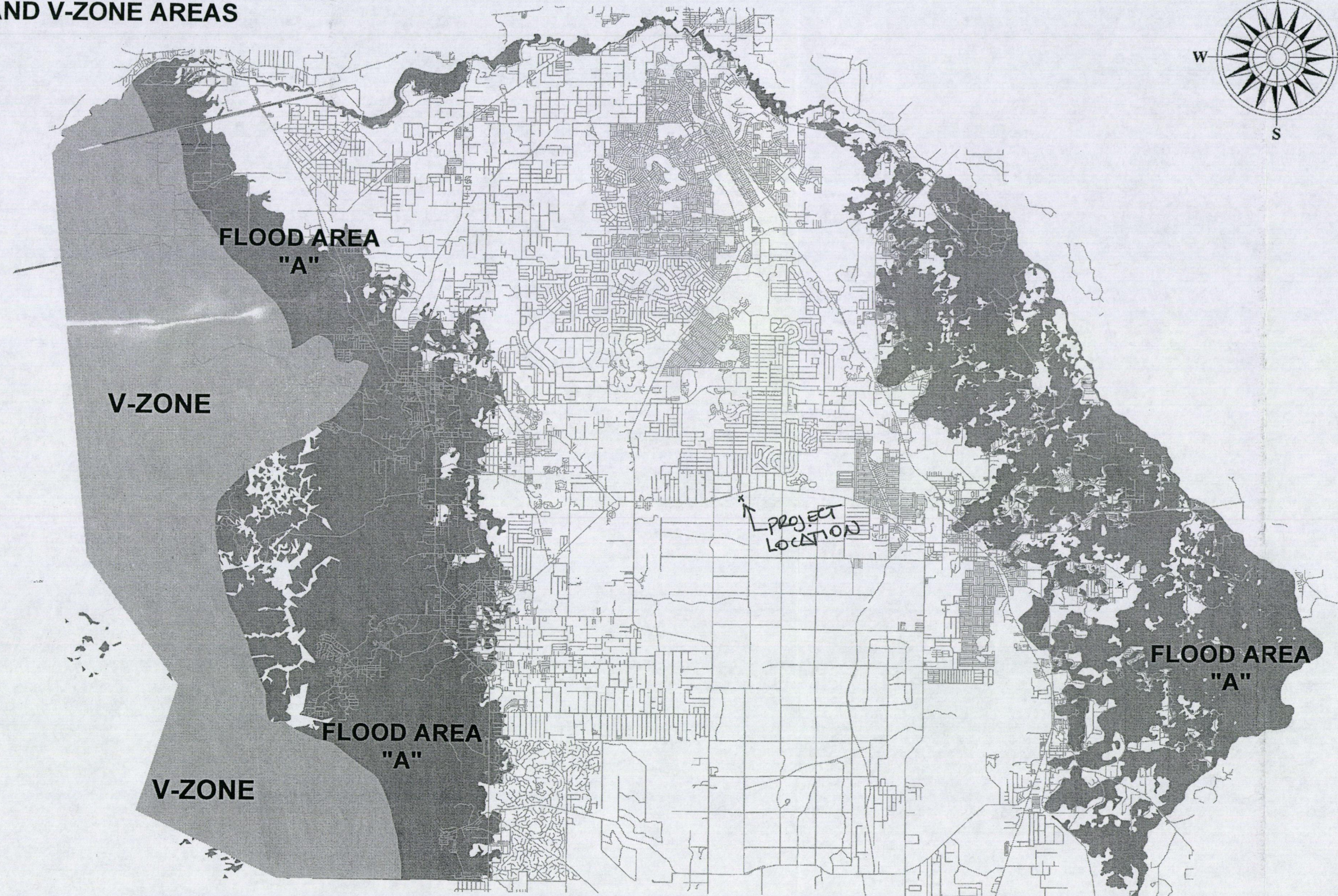
0 0 represents No Reading

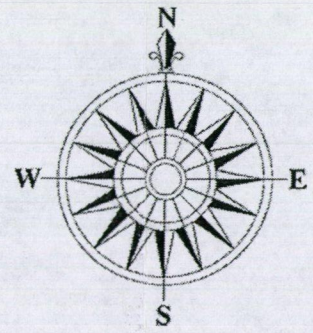
PHASE 1, 1A & 2 TOTAL ACRES 26 1 - 1 OPEN, 23 95 INTERMEDIATE, 1 5 UNUSED, 0 0 CLOSED - update

Special Project Reseeded SBR#1 & SBR#3

12/4-12/10/08 Effluent recirculated due to ammonia results

CITRUS COUNTY FLORIDA
FLOOD ZONE A
AND V-ZONE AREAS





Miles
0 1 2 3 4 5 6 7

INFORMATION COMPILED FROM DIGITIZED DATA.
THIS MAP IS MEANT FOR GENERAL PLANNING
PURPOSES ONLY.

FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
JUN 11 2009
SOUTHWEST DISTRICT
TAMPA

CITRUS COUNTY

CITRUS COUNTY FLORIDA
FLOOD ZONE A
AND
V-ZONE AREAS

Legend

- FLOOD ZONE A
- VELOCITY ZONE

Table Reference Number	FNAI lands inside the FIRM 100 year flood zone

COORDINATE INFORMATION
Projection : NAD_1983_StatePlane_Florida_West_FIPS_0902_Feet
Datum : D_North_American_1983
Units : Foot_US
Spheroid : GRS_1980

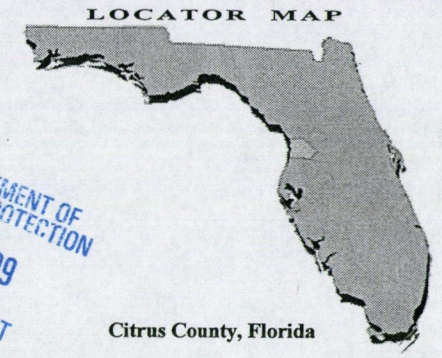
PREPARED BY : Citrus County Department of Development Services

SOURCE : The FLORIDA NATURAL AREAS INVENTORY

DATE : July, 2005

Community Development Division
Planning for the Future

LOCATOR MAP



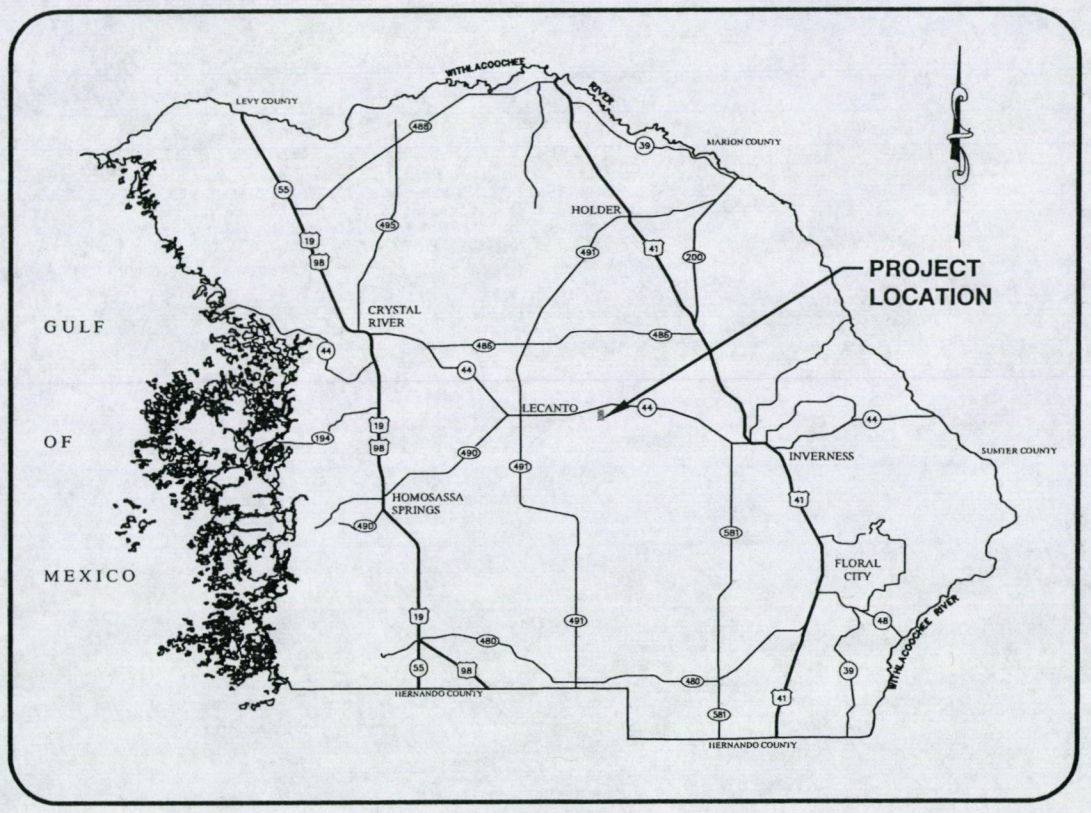
Citrus County, Florida

CITRUS COUNTY
SOLID WASTE TRANSFER STATION
AND ASSOCIATED SITE IMPROVEMENTS

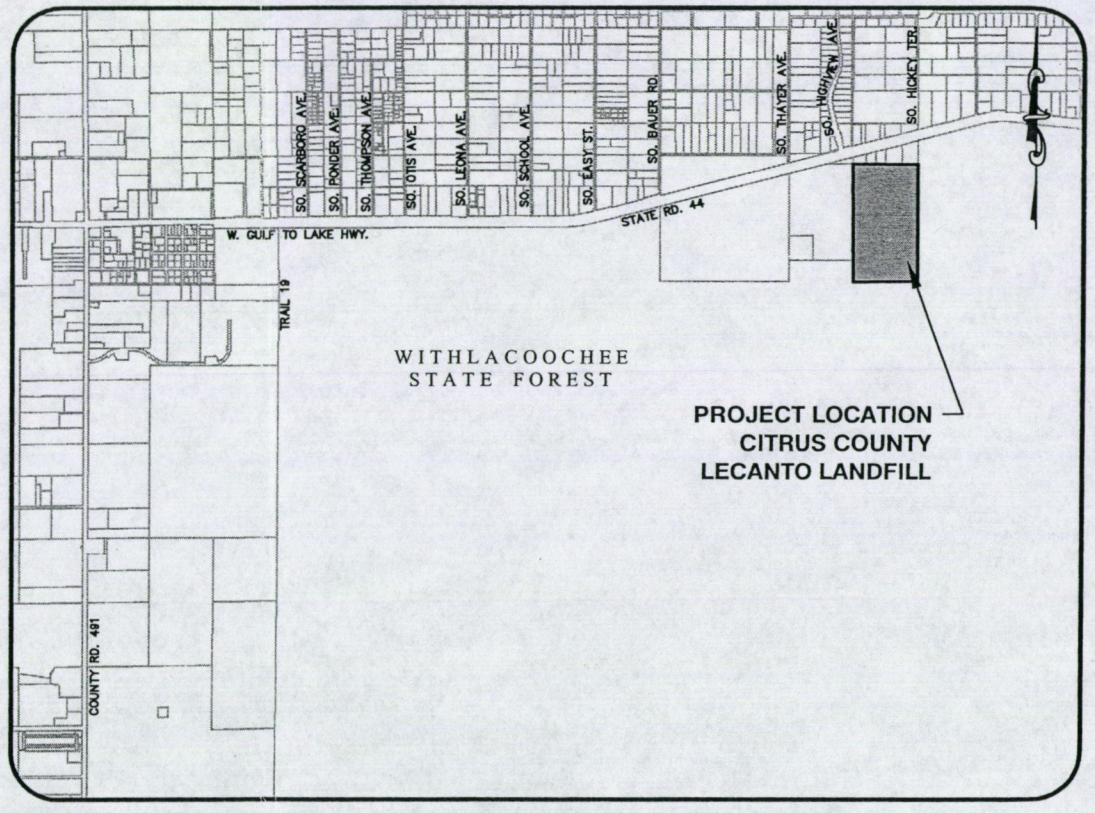
SEC. 01, TWP 19 S., RGE 18 E.

CITRUS COUNTY, FLORIDA

PROJECT NO. 353076



CITRUS COUNTY
VICINITY MAP



LOCATION MAP

BOARD OF COUNTY COMMISSIONERS

CHAIRMAN	JOHN THRUMSTON
1st VICE CHAIRMAN	GARY BARTELL
2nd VICE CHAIRMAN	DENNIS DAMATO
COMMISSIONER	JOE MEEK
COMMISSIONER	WINN WEBB
COUNTY ADMINISTRATOR:	BRAD THORPE

PUBLIC WORKS DEPARTMENT

PUBLIC WORKS DIRECTOR:	GLENN McCRACKEN
COUNTY ENGINEER:	CHARLES BALUT
DIRECTOR OF SOLID WASTE MANAGEMENT:	SUSAN METCALFE

APPROVED BY: _____ DATE: _____

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
JUN 11 2009
SOUTHWEST DISTRICT
TAMPA

G:\ENGINEER\AUTOMATED\DWGS_SUBMITTED\DWGS_SUBMITTED.dwg, June 5, 2009 12:08 PM, LSD, King Engineering Associate Inc.
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King
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Tampa, Florida 33634
Phone 813 880-8881
Fax 813 880-8882
www.kingengineering.com
Engineering License #2610

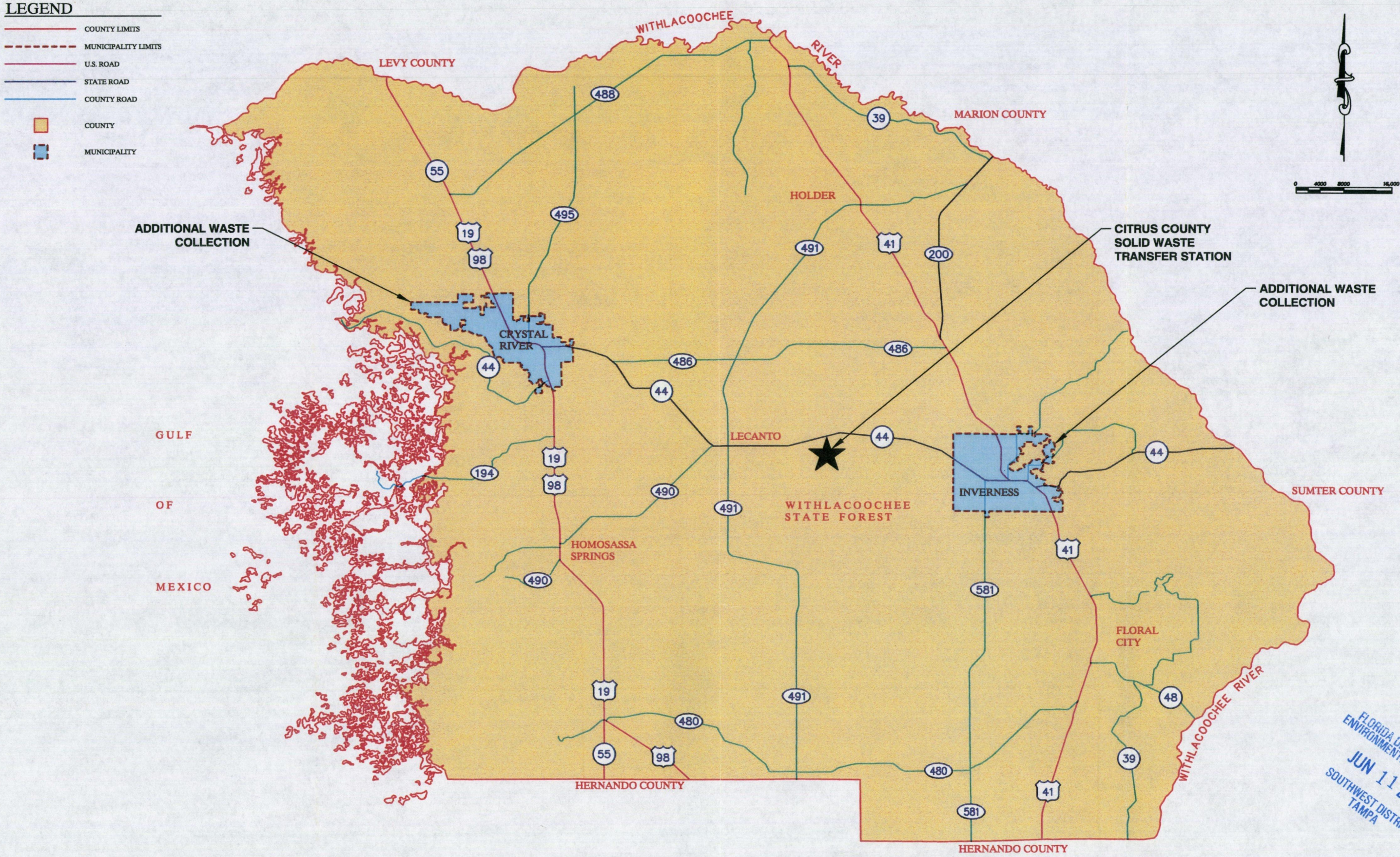
CITRUS COUNTY
BOARD OF COUNTY COMMISSIONERS
110 NORTH APOPKA AVENUE – INVERNESS, FLORIDA 34450

PERMIT LEVEL DRAWINGS

NO.	DATE	DESCRIPTION	APP'D BY
4	06/10/09	ERP RAI #1	CFK
D	05/15/09	PERMIT LEVEL DRAWINGS	CFK
C	04/13/09	ERP SUBMITTAL	CFK
B	12/19/08	60% SUBMITTAL	CFK
A	07/07/08	30% SUBMITTAL	CFK

CHRISTOPHER F. KUZLER, P.E.
Jun. 5, 2009
FL.P.E.No.46532
PROFESSIONAL SEAL

JOB NO. 4217-001-001
DATE JULY 2008



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
JUN 11 2009
SOUTHWEST DISTRICT
TAMPA

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DESIGNED CS
DRAWN CS
CHECKED
Q.C.

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CITRUS COUNTY
SOLID WASTE TRANSFER STATION
& ASSOCIATED SITE IMPROVEMENTS
FOR
CITRUS COUNTY BOARD OF COUNTY COMMISSIONERS

COUNTY WASTE COLLECTION BOUNDARY

JOB NO. 4217-001-001
DATE: MAY 2009
SCALE: AS SHOWN
EXHIBIT NO. 1

SHEET INDEX

GENERAL

SHEET NUMBER	DESCRIPTION
G0.00	COVER
G1.00	SHEET INDEX
G1.01	ABBREVIATIONS AND LEGENDS
G1.02	NOTES
G1.03	CONSTRUCTION POLLUTION PREVENTION PLAN

CIVIL

SHEET NUMBER	DESCRIPTION
C1.00	BOUNDARY SURVEY
C1.01	EXISTING OVERALL SITE PLAN
C1.02	EXISTING PROJECT AREA PLAN
C1.03	EXISTING PROJECT SITE DEMOLITION AND TREE REMOVAL PLAN
C1.04	SITE PHASING PLAN
C2.01	EXISTING CONDITIONS PROJECT DRAINAGE MAP
C2.02	PROPOSED CONDITIONS PROJECT DRAINAGE MAP
C2.03	PROPOSED SITE & TRAFFIC PATTERN PLAN
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C3.03	SITE PLAN (3)
C3.04	SITE PLAN (4)
C3.05	SITE PLAN (5)
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C4.02	PAVING, GRADING AND DRAINAGE PLAN (2) – PHASE 1
C4.02A	PAVING, GRADING AND DRAINAGE PLAN (2) – PHASE 2
C4.03	PAVING, GRADING AND DRAINAGE PLAN (3)
C4.04	PAVING, GRADING AND DRAINAGE PLAN (4) – PHASE 1
C4.04A	PAVING, GRADING AND DRAINAGE PLAN (4) – PHASE 2
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C4.06	PAVING, GRADING AND DRAINAGE DETAILS (1)
C4.07	PAVING, GRADING AND DRAINAGE DETAILS (2)
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C6.00	CSA PLAN
C6.01	CSA SECTIONS
C6.02	CSA SECTIONS
C6.03	TRANSFER STATION BUILDING SECTIONS
C7.00	NOT USED
C8.00	UTILITY SITE PLAN KEY SHEET
C8.01	OVERALL PROPOSED UTILITY SITE PLAN
C8.02	UTILITY SITE PLAN (1)
C8.03	NOT USED
C8.04	UTILITY SITE PLAN (2)
C8.05	UTILITY SITE PLAN (3)
C8.06	UTILITY SITE PLAN (4)
C8.07	UTILITY SITE PLAN (5)
C8.08	UTILITY SITE PLAN (6)
C8.09	UTILITY DETAILS (1)
C8.10	UTILITY DETAILS (2)
C8.11	UTILITY DETAILS (3)
C8.12	UTILITY DETAILS (4)
C9.00	UTILITY SEPARATION PLAN AND DETAILS

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SHEET NUMBER	DESCRIPTION
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M3.00	FUELING STATION GENERAL ARRANGEMENT PLAN
M3.01	FUELING STATION SECTIONS
M3.02	FUELING STATION SECTIONS
M4.00	BOOSTER PUMP STATION GENERAL ARRANGEMENT PLAN
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M4.02	BOOSTER PUMP STATION SECTIONS AND DETAILS
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M5.01	EXISTING LEACHATE PUMP STATION CONNECTION AND FLOW METER VAULT GENERAL ARRANGEMENT PLAN
M5.02	LEACHATE FLOW METER VAULT PLAN AND SECTION
M6.00	AEROBIC DRIP TAPE SEPTIC SYSTEM AND LEACH FIELD PLAN AND SECTIONS
M7.00	AEROBIC DRIP TAPE SEPTIC SYSTEM PUMP STATION MECHANICAL PLAN AND DETAILS
M8.00	LEACHATE PUMP STATION MECHANICAL PLAN AND DETAILS
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SHEET NUMBER	DESCRIPTION
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S1.02	TRANSFER STATION BUILDING FOUNDATION PLAN
S1.03	TRANSFER STATION BUILDING PARTIAL UPPER PLAN
S1.04	TRANSFER STATION BUILDING PARTIAL UPPER PLAN
S1.05	TRANSFER STATION BUILDING INTERMEDIATE FRAMING PLAN
S1.06	TRANSFER STATION BUILDING SECTIONS
S1.07	TRANSFER STATION BUILDING SECTION
S1.08	TRANSFER STATION BUILDING SECTION
S1.09	TRANSFER STATION BUILDING SECTION
S1.10	TRANSFER STATION BUILDING SECTION
S1.11	TRANSFER STATION BUILDING SECTIONS
S1.12	TRANSFER STATION BUILDING SECTIONS
S1.13	TRANSFER STATION BUILDING ELEVATION
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S2.02	HOUSEHOLD HAZARDOUS WASTE FACILITY FLOOR PLAN
S2.03	HOUSEHOLD HAZARDOUS WASTE FACILITY SECTION
S2.04	HOUSEHOLD HAZARDOUS WASTE FACILITY SECTIONS
S2.05	HOUSEHOLD HAZARDOUS WASTE FACILITY SECTION
S2.06	HOUSEHOLD HAZARDOUS WASTE FACILITY RETAINING WALL SECTIONS
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S3.02	SCALE HOUSE ROOF PLAN
S3.03	SCALE HOUSE CANOPY FOUNDATION PLAN
S3.04	SCALE HOUSE SECTIONS
S3.05	SCALE HOUSE SECTION
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S5.02	DRY STORAGE BUILDING SECTIONS

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SHEET NUMBER	DESCRIPTION
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A1.02	TRANSFER STATION BUILDING BASEMENT FLOOR PLAN
A1.03	TRANSFER STATION BUILDING GRADE FLOOR PLAN
A1.04	TRANSFER STATION BUILDING OPERATOR'S BOOTH FLOOR PLAN
A1.05	TRANSFER STATION BUILDING ROOF PLAN
A1.06	NOT USED
A1.07	TRANSFER STATION BUILDING NORTH & EAST ELEVATIONS
A1.08	TRANSFER STATION BUILDING SOUTH & WEST ELEVATIONS
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A2.02	HOUSEHOLD HAZARDOUS WASTE BUILDING FLOOR PLAN
A2.03	HOUSEHOLD HAZARDOUS WASTE ROOF PLAN
A2.04	HOUSEHOLD HAZARDOUS WASTE BUILDING REFLECTED CEILING PLAN
A2.05	NOT USED
A2.06	HOUSEHOLD HAZARDOUS WASTE ELEVATIONS
A2.07	HOUSEHOLD HAZARDOUS WASTE SOUTH AND WEST ELEVATION
A2.08	HOUSEHOLD HAZARDOUS WASTE ELEVATIONS
A2.09	HOUSEHOLD HAZARDOUS WATSE BUILDING SECTIONS
A2.10	HOUSEHOLD HAZARDOUS WASTE WALL SECTIONS
A2.11	HOUSEHOLD HAZARDOUS WASTE ACCESSORY SCHEDULE, ENLARGED PLAN AND RESTROOM ACCESSORY SCHEDULE
A3.01	SCALE HOUSE LIFE SAFETY PLAN
A3.02	SCALE HOUSE FLOOR PLAN
A3.03	SCALE HOUSE WALL SECTIONS
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A5.01	DRY STORAGE BUILDING LIFE SAFETY PLAN / FLOOR PLAN AND ROOF PLAN
A5.02	DRY STORAGE BUILDING ELEVATIONS
A5.03	DRY STORAGE BUILDING SECTIONS AND DETAILS
A6.01	DOOR DETAILS
A6.02	DOOR, WINDOW, AND LOUVER DETAILS
A6.03	STANDARD DETAILS
A6.04	STANDARD DETAILS
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INSTRUMENTATION

SHEET NUMBER	DESCRIPTION
I0.01	I&C LEGEND 1
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I1.01	TRANSFER STATION SCALE SYSTEM BLOCK DIAGRAM
I1.02	TRANSFER STATION – BLOCK DIAGRAM
I1.03	SCALEHOUSE SCALE SYSTEM BLOCK DIAGRAM
I1.04	SCALEHOUSE CCTV NETWORK BLOCK DIAGRAM
I1.05	SITE CAMERA COVERAGE
I1.06	BLOCK DIAGRAM
I1.07	RACK LAYOUTS AND OUTLET SCHEDULE

ELECTRICAL

SHEET NUMBER	DESCRIPTION
E0.01	LEGEND
E0.02	LEGEND
E0.03	OVERALL SITE PLAN
E1.01	TRANSFER STATION BUILDING BASEMENT ELECTRICAL PLAN
E1.02	TRANSFER STATION GRADE ELECTRICAL PLAN
E1.03	ENLARGED OPERATOR'S BOOTH AND ELECTRICAL ROOM PLAN
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E2.02	HOUSEHOLD HAZARDOUS WASTE FACILITY ENLARGED PLAN
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E3.02	SCALE HOUSE CANOPY POWER PLAN
E3.03	SCALE HOUSE CANOPY LIGHTING PLAN
E3.04	SCALE HOUSE CANOPY POWER PLAN
E4.01	ELECTRICAL BUILDING FLOOR PLAN
E5.01	DRY STORAGE BUILDING FLOOR PLAN
E6.01	SINGLE LINE DIAGRAM
E6.02	SINGLE LINE DIAGRAM

HVAC

SHEET NUMBER	DESCRIPTION
H0.01	LEGEND
H1.01	TRANSFER STATION BUILDING BASEMENT FLOOR PLAN
H1.02	TRANSFER STATION BUILDING GRADE FLOOR PLAN
H2.01	HOUSEHOLD HAZARDOUS WASTE FLOOR PLAN
H2.02	HOUSEHOLD HAZARDOUS WASTE ENLARGED PLANS AND SECTIONS
H3.01	SCALE HOUSE FLOOR PLAN
H4.01	ELECTRICAL BUILDING FLOOR PLAN
H5.01	DRY STORAGE BUILDING FLOOR PLAN
H6.01	EUIPMENT SCHEDULES
H6.02	EUIPMENT SCHEDULES
H6.03	CONTROL DIAGRAMS AND SEQUENCE OF OPERATIONS
H6.04	CONTROL DIAGRAMS AND SEQUENCE OF OPERATIONS
H6.05	DETAILS
H6.06	DETAILS

PLUMBING

SHEET NUMBER	DESCRIPTION
P0.01	LEGEND AND ABBREVIATIONS
P1.01	TRANSFER STATION BUILDING UPPER FLOOR PLAN
P1.02	TRANSFER STATION BUILDING LOWER FLOOR PLAN
P2.01	HOUSEHOLD HAZARDOUS WASTE FLOOR PLAN WASTE
P2.02	HOUSEHOLD HAZARDOUS WASTE FLOOR PLAN WATER
P3.01	SCALE HOUSE FLOOR PLAN
P6.01	RISERS DIAGRAMS
P6.02	DETAILS
P6.03	DETAILS
P6.04	DETAILS

LANDSCAPE

SHEET NUMBER	DESCRIPTION
L1.01	LANDSCAPE LAYOUT KEY SHEET
L1.02	LANDSCAPE PLAN (1)
L1.03	LANDSCAPE PLAN (2)
L1.04	LANDSCAPE PLAN (3)
L1.05	LANDSCAPE PLAN (4)
L1.06	LANDSCAPE DETAILS & SPECIFICATION

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
AUG 26 2009
SOUTHWEST DISTRICT TAMPA

INDICATES FILES NOT INCLUDED IN THIS SET

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DESIGNED CS
DRAWN CS
CHECKED
Q.C.

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King
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One Memorial Center, Suite 300
Tampa, Florida 33634
Phone 813 880-8881
Fax 813 880-8882
www.kingengineering.com
Engineering License #2610

CITRUS COUNTY
SOLID WASTE TRANSFER STATION
& ASSOCIATED SITE IMPROVEMENTS
FOR
CITRUS COUNTY BOARD OF COUNTY COMMISSIONERS

SHEET INDEX

NO.	DATE	DESCRIPTION	APP'D BY
F	XX/XX/09	ERP SUBMITTAL	CFK/LGD
E	05/20/09	90% SUBMITTAL	CFK/LGD
D	05/15/09	DEP SOLID WASTE SUBMITTAL	CFK/LGD
C	04/13/09	ERP SUBMITTAL	CFK/LGD
B	12/19/08	60% SUBMITTAL	CFK/LGD
A	07/07/08	30% SUBMITTAL	CFK/LGD

CHRISTOPHER F. KUZLER, P.E.
Jun. 10, 2009
FL P.E. No. 45532
PROFESSIONAL SEAL

JOB NO. 4217-001-001
DATE: JULY 2008
SCALE: AS SHOWN
SHEET NO. G1.00

Attachment E
Fire Inspection Report

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SCALE: 1" = 10'

153'

KNUCKLEBOOM TAMPER

CONC. PUSH WALL
(TYP.)

SURGE PILES

115'

45'

58'

73'

50'

15'

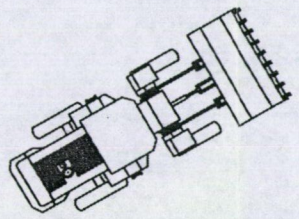
15'

65'

1

2

3



PROPOSED FRANCHISE
HAULER TIPPING AREA

BASE BUILDING SIZE
153' x 115'

15'

19'

30'

45'

15'

34'

SELF HAUL UNLOAD STALLS
1-10' x 20' OVERHEAD
DOOR WITH ROOF

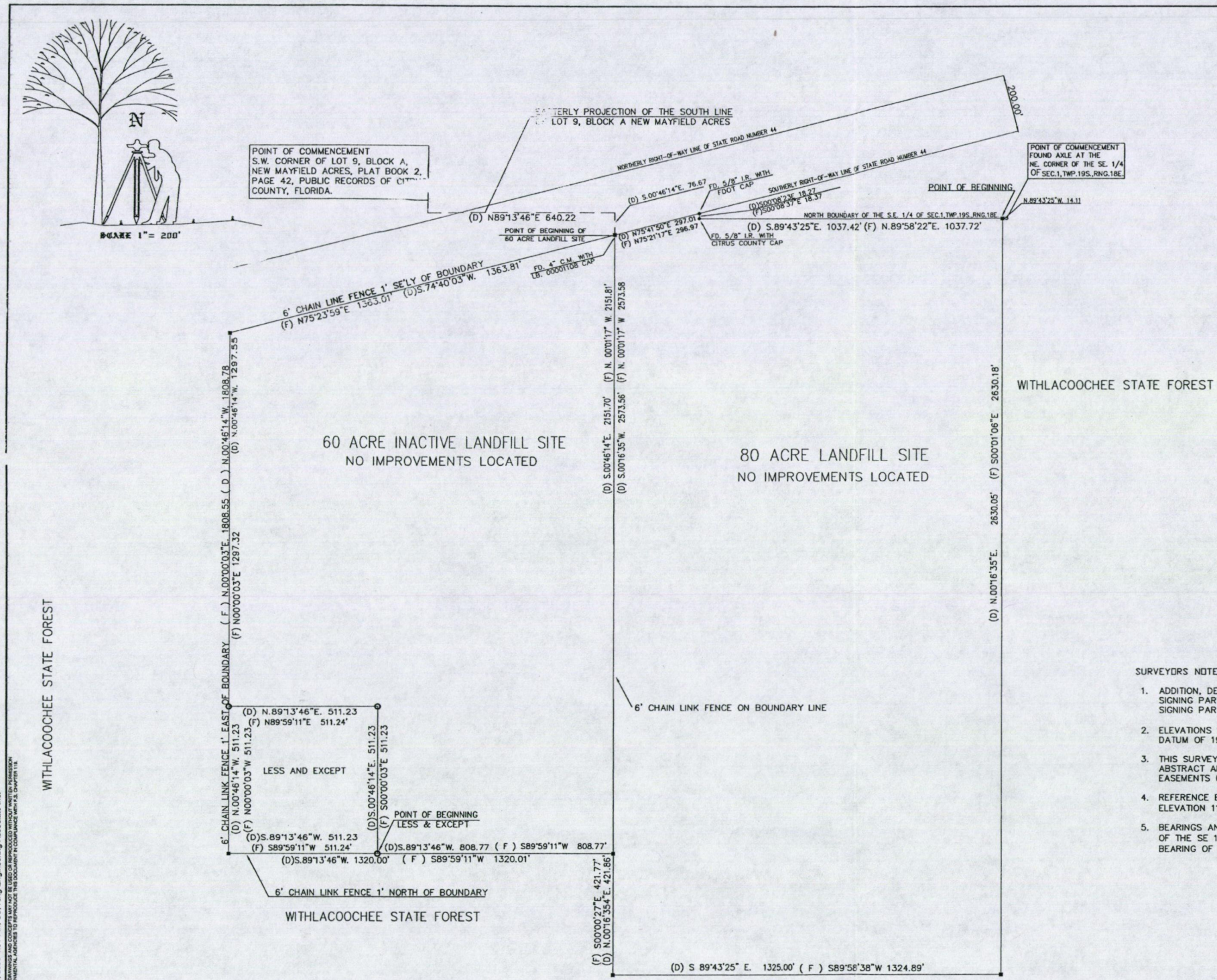
FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
JUN 11 2009
SOUTHWEST DISTRICT
TAMPA

20' x 24' OVERHEAD DOOR
4 PLACES

DESIGNED JLM DRAWN CS CHECKED SVM G.C. CFK	THE SIGNATURE OF THE QUALITY CONTROL OFFICER IN THIS SPACE INDICATES THAT ALL REQUIRED PERMITS HAVE BEEN OBTAINED AND THAT CONSTRUCTION IS AUTHORIZED TO COMMENCE.	King ENGINEERING ASSOCIATES, INC.	4921 Memorial Highway One Memorial Center, Suite 300 Tampa, Florida 33634 Phone 813 880-8881 Fax 813 880-8882 www.kingengineering.com Engineering License #2610	CITRUS COUNTY SOLID WASTE TRANSFER STATION AND ASSOCIATED SITE IMPROVEMENTS FOR CITRUS COUNTY BOARD OF COUNTY COMMISSIONERS	JOB NO. 4217-001-000 DATE: DECEMBER 2007 SCALE: AS SHOWN

SURGE PILE LAYOUT
2 COMMERCIAL TIPPING BAYS AVAILABLE

EXHIBIT 4



DESCRIPTION AS FURNISHED

A PORTION OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 18 EAST, TALLAHASSEE MERIDIAN, CITRUS COUNTY, FLORIDA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCE AT THE NORTHEAST CORNER OF THE SOUTHEAST 1/4 OF SECTION 1, TOWNSHIP 19, SOUTH, RANGE 18 EAST, TALLAHASSEE MERIDIAN; THENCE N.89°43'25"W. ALONG THE NORTH BOUNDARY OF THE SOUTHEAST 1\4 OF SAID SECTION 1, A DISTANCE OF 14.11 FEET TO THE POINT OF BEGINNING SAID POINT BEING THE NORTHEAST CORNER OF THOSE LANDS DESCRIBED IN OFFICIAL RECORD BOOK 759, PAGE 889, PUBLIC RECORDS OF CITRUS COUNTY, FLORIDA; THENCE S.00°16'35"E., A DISTANCE OF 2,630.05 FEET; THENCE N.89°43'25"W. PARALLEL WITH THE NORTH BOUNDARY OF THE SOUTHEAST 1/4 OF SAID SECTION 1, A DISTANCE OF 1,325.00 FEET; THENCE N.00°16'35"E., A DISTANCE OF 2,573.56 FEET TO A POINT ON THE SOUTH RIGHT-OF-WAY LINE OF STATE ROAD No. 44, SAID POINT BEING 150.00 FEET FROM, WHEN MEASURED AT RIGHT ANGLES TO THE CENTERLINE OF SAID STATE ROAD No. 44; THENCE N.75°41'50"E. ALONG SAID SOUTH RIGHT-OF-WAY LINE, A DISTANCE OF 297.01 FEET; THENCE DEPARTING SAID SOUTH RIGHT-OF-WAY LINE S.00°08'23"E., A DISTANCE OF 18.27 FEET TO A POINT ON THE NORTH BOUNDARY OF THE SOUTHEAST 1/4 OF SAID SECTION 1; THENCE S.89°43'25"E. ALONG THE NORTH BOUNDARY OF THE SOUTHEAST 1/4 OF SAID SECTION 1, A DISTANCE OF 1,037.42 FEET TO THE POINT OF BEGINNING.
CONTAINING 79.87 ACRES, MORE OR LESS.

AND

A PORTION OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 18 EAST BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCE AT THE SOUTHWEST CORNER OF LOT 9, BLOCK A, NEW MAYFIELD ACRES AS RECORDED IN PLAT BOOK 2, PAGE 49, PUBLIC RECORDS OF CITRUS COUNTY, FLORIDA, THENCE N.89°13'46"E. ON AN EASTERLY PROJECTION OF THE SOUTH LINE OF SAID LOT 9, BLOCK A, A DISTANCE OF 640.22 FEET, THENCE S.0°46'14"E., A DISTANCE OF 76.67 FEET TO A POINT THAT IS 150 FEET FROM, MEASURED AT A RIGHT ANGLE TO, THE CENTERLINE OF STATE ROAD No. 44, SAID POINT ALSO BEING THE POINT OF BEGINNING; THENCE CONTINUE S0°46'14"E. A DISTANCE OF 2151.70 FEET; THENCE S.89°13'46"W., A DISTANCE OF 1320 FEET; THENCE N.0°46'14"W., A DISTANCE OF 1808.78 FEET TO A POINT THAT IS 150 FEET FROM, MEASURED AT A RIGHT ANGLE TO, THE CENTERLINE OF SAID STATE ROAD No. 44; THENCE N.74°40'03"E. PARALLEL TO AND 150 FEET FROM THE CENTERLINE OF STATE ROAD No. 44 A DISTANCE OF 1363.81 FEET TO THE POINT OF BEGINNING.

LESS AND EXCEPT

A PORTION OF SECTION 1, TOWNSHIP 19 SOUTH, RANGE 18 EAST, CITRUS COUNTY, FLORIDA DESCRIBED AS FOLLOWS: COMMENCE AT THE SW CORNER OF LOT 9, BLOCK A, NEW MAYFIELD ACRES AS RECORDED IN PLAT BOOK 2, PAGE 42, PUBLIC RECORDS OF CITRUS COUNTY, FLORIDA, THENCE S. 89°43'25" E. ALONG THE SOUTH LINE OF SAID LOT 9 AND AN EASTERLY PROJECTION THEREOF A DISTANCE OF 640.22 FEET, THENCE S. 0°16'35" W. 76.49 FEET TO A POINT THAT IS 150 FEET SOUTHEASTERLY FROM, MEASURED AT A RIGHT ANGLE TO, THE CENTERLINE OF STATE ROAD No. 44, THENCE CONTINUE S. 0°16'35" W 2151.70 FEET, THENCE S. 89°13'46" W. 808.77 FEET TO THE POINT OF BEGINNING, THENCE CONTINUE S. 89°13'46" W. 511.23 FEET, THENCE N. 0°46'14" W. 511.23 FEET, THENCE N. 89°13'46" E. 511.23 FEET, THENCE S. 0°46'14" E. 511.23 FEET TO THE POINT OF BEGINNING, SAID EXCEPTION CONTAINING 6 ACRES MORE OR LESS.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
JUN 11 2009
SOUTHWEST DISTRICT TAMPA

SURVEYORS NOTES:

1. ADDITION, DELETIONS AND MODIFICATIONS TO THESE DRAWINGS BY OTHER THAN THE SIGNING PARTY OR PARTIES IS PROHIBITED BY LAW WITHOUT THE WRITTEN CONSENT OF THE SIGNING PARTY OR PARTIES.
2. ELEVATIONS SHOWN HEREON (IF ANY) ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
3. THIS SURVEY WAS CONDUCTED WITHOUT THE BENEFIT OF A TITLE REPORT OR TITLE ABSTRACT AND THEREFORE MAY NOT NECESSARILY SHOW ALL RIGHTS-OF-WAY, EASEMENTS OR OTHER ENCUMBRANCES OF RECORD.
4. REFERENCE BENCH MARK, FLORIDA DEPARTMENT OF TRANSPORTATION BENCH MARK No. 54, ELEVATION 115.05' N.G.V.D. 1929
5. BEARINGS AND DIMENSIONS, AS SHOWN HEREON, ARE BASED ON THE NORTH BOUNDARY OF THE SE 1/4 OF SECTION 1, TOWNSHIP 18 SOUTH, RANGE 18 EAST HAVING AN ASSUMED BEARING OF N.89°58'22"E.

REVISION DATE: JULY 22, 1996
REVISE BOUNDARY TO NEW LEGAL DESCRIPTION

REVISION DATE: SEPTEMBER 27, 2000
FIELD DATE: SEPTEMBER 27, 2000
ADD SHEET 2 OF 2 LOCATION SURVEY OF RECYCLE ALLEY

REVISION DATE: OCTOBER 31, 2000
FIELD DATE: OCTOBER 26, 2000
ADD SHEETS 3,4 AND 5

REVISION DATE: APRIL 2, 2002
FIELD DATE: FEBRUARY 8, 2002
UNDERGROUND LOCATION

REVISION DATE: JULY 25, 2002
FIELD DATE: JULY 22, 2002
UNDERGROUND LOCATION

REVISION DATE: FEBRUARY 25, 2005
FIELD DATE: FEBRUARY 24, 2005
ADD 60 ACRE SURVEY

REVISION DATE: JANUARY 30, 2008
FIELD DATE: JANUARY 21, 2008
ADD SHEET 6 OF 6 TRANSFER STATION

BOUNDARY SURVEY OF CITRUS COUNTY CENTRAL LANDFILL

Proj. No.	89-615
Drawn by:	P.L.H.
Approved by:	
Date:	
Scale:	1" = 200'
Sheet No.	1 OF 6
Field Date:	10/26/00
Field Book:	8 - 8D
Pages:	ALL INCLUSIVE
SEC. 1 TWP. 19S RNG. 18E	

Citrus County
Department of Technical Services
Division of Engineering
P.O. BOX 440 Lecanto, FL. 34461
Phone: (904)746-2694

SURVEYOR'S CERTIFICATION
I hereby certify that the herein described land survey and plat are true and correct and was prepared under my direction and supervision and conforms to the minimum technical standards set forth by the Florida Board of Professional Land Surveyors in Chapter 61G17-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

Dated this ____ day of _____ 2008

Patrick L. Henson Professional Surveyor Mapper No. 4547
Not valid without an original signature and seal.

■ FOUND 4"X4" CONCRETE MONUMENT
○ SET 4"X4" CONCRETE MONUMENT COUNTY CAP
△ DESCRIPTIVE POINT
⊗ FOUND IRON ROD
○ SET 5/8" DIA. IRON ROD COUNTY CAP
⊡ FOUND IRON ROD SET 4"X4" CONCRETE MONUMENT
⬭ ELEVATION R/W RIGHT-OF-WAY
✦ = BENCHMARK
⊙ = MONITOR WELL

P.O.B. = POINT OF BEGINNING
P.O.C. = POINT OF COMMENCEMENT
P.R.C.C.F. = PUBLIC RECORDS OF CITRUS COUNTY, FLORIDA
(P)= PLAT, (D) = DEED, (F) FIELD
O.R.B. = OFFICIAL RECORD BOOK
P.B. = PLAT BOOK
P.R.M. = PERMANENT REFERENCE MONUMENT
T.B.M. = TEMPORARY BENCHMARK
P.C.P. = PERMANENT CONTROL POINT
C.B.S. = CONCRETE BLOCK STRUCTURE
C/S = CONCRETE SLAB

FILE PAGE 312

DESIGNED CS
DRAWN CS
CHECKED
Q.C.

THE SIGNATURE OF THE QUALITY CONTROL OFFICER IN THIS SPACE INDICATES THAT ALL REQUIRED PERMITS HAVE BEEN OBTAINED AND THAT CONSTRUCTION IS AUTHORIZED TO COMMENCE.

King
ENGINEERING ASSOCIATES, INC.

4921 Memorial Highway
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Tampa, Florida 33634
Phone 813 880-8881
Fax 813 880-8882
www.kingengineering.com
Engineering License #2610

CITRUS COUNTY
SOLID WASTE TRANSFER STATION
& ASSOCIATED SITE IMPROVEMENTS
FOR
CITRUS COUNTY BOARD OF COUNTY COMMISSIONERS

BOUNDARY SURVEY

NO.	DATE	DESCRIPTION	APPD BY
B	12/19/08	60% SUBMITTAL	
A	07/07/08	30% SUBMITTAL	CFK

PROFESSIONAL SEAL

JOB NO. 4217-001-001
DATE: JULY 2008
SCALE: AS SHOWN
SHEET NO. C1.00

O:\ENV_ENG\4217\001\001\acaddfngs\C1.00.dwg, December 19, 2008 4:31 PM, CS, King Engineering Associate Inc.
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O:\ENV_ENG\4217\001\000\REPORTS\PER\FIGURE-1.dwg , December 20, 2007 2:08 PM, MJG, King Engineering Associate Inc.

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FIGURE 1

King
ENGINEERING ASSOCIATES, INC.

4921 Memorial Highway
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Phone 813 880-8881
Fax 813 880-8882
www.kingengineering.com
Engineering License #2610

CITRUS COUNTY
SOLID WASTE TRANSFER STATION
& ASSOCIATED SITE IMPROVEMENTS

EXISTING CONDITIONS
& TOPOGRAPHIC SITE PLAN

JOB NO. 4217/001/000
DATE: DEC. 2007
SCALE: AS SHOWN

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
JUN 11 2009
SOUTHWEST DISTRICT
TAMPA