

Golf Course Specifications

For



Collier's Reserve Country Club

Naples, Florida

GOLF COURSE RENOVATION/RESTORATION

AUGUST 2019

Prepared by:



TABLE OF CONTENTS

Project Directory	3
Project Introduction	4 – 11
Proposal Form	12-15
Temporary Facilities	16 - 17
General Conditions	18
Supplementary General Conditions	19 - 22
Special Conditions	23 - 27
Preface	28
Section A Mobilization	29
Section B Layout and Staking	30 - 31
Section C Site Preparation, Excavation, Filling, and Rough Grading	32 - 34
Section D Golf Course Drainage	35 - 38
Section E Golf Course Irrigation	39
Section F Cart Path Installation – Asphalt	40 - 49
Section G Greens Construction	50 - 58
Section H Tee Construction	59 - 60
Section I Bunker Construction and Sand Installation	61 - 66
Section J Cleanup and Finish Grading	67 - 71
Section K Grassing	72 - 75
Section L Completion of Contract and Punch List	76
Section M Conclusion of the Specifications	77

PROJECT DIRECTORY

Owner's Representative:

Collier's Reserve Country Club
Ken Kleinedler
11700 Collier's Reserve Drive
Naples, FL 34110
Office - (239) 254-2867
Mobile – (239) 451-9441

Golf Course Architect:

Hills • Forrest • Smith
Steve Forrest
7351 West Bancroft
Toledo, Ohio 43615
Office - (419) 841-8553
Mobile – (419) 320-6556
spforrest@hillsforrestsmith.com

Shawn Smith
Mobile – (419) 344-5321
ssmith@hillsforrestsmith.com

PROJECT INTRODUCTION

INVITATION TO BID

Collier's Reserve Country Club, located in Naples, Florida, hereinafter called "OWNER", invites bids for the renovation/restoration of the golf course and practice facilities. All bids must be submitted in accordance with these instructions and conditions.

A prebid meeting will be held at the Collier's Reserve Club House Administrative Offices at 1:00pm on August 15, 2019.

WORK SCHEDULE

If approved by the membership, construction is scheduled to begin on April 5, 2021 with all grassing is to be completed by August 1, 2021. An add alternate price has been included in the Itemized Bid Form in the event the membership chooses to delay construction until April, 2022.

PREPARATION OF BIDS

The bids submitted on forms provided herein and returned intact with the Complete Documents (Bid Summary, Unit Price Schedule of Values, Project Schedule, Project superintendent information, Hourly equipment rates and Subcontractor information). All blank spaces for Bid prices must be filled in. The Bid for each phase of construction shall indicate both a unit price and a lump sum Bid. Proposals showing any alterations, additions, omissions, or other irregularities may be rejected. If erasures or other changes appear on the forms, each such erasure or change must be initialed by the person signing the Bid.

ALL BIDDERS AND SUB BIDDERS acknowledge and agree that any information that they may have obtained from the OWNER or its consultants relating to site conditions (including surface, sub-surfaces, and existing structures, if any), availability of materials or labor, applicable statutes, ordinances, or regulations and any other information not specifically provided for otherwise in the proposed Contract documents, shall be for general information purposes only and the OWNER does not warrant or represent the accuracy or completeness thereof. **ALL BIDDERS and SUB BIDDERS agree that they shall and by submission of a Bid, do warrant and represent that they have made their own independent investigation of such matters, have reached their own conclusion with respect thereto and have relied completely on their own such investigations in connection with the preparation of their Bid.**

RECEIPT OF BIDS

Bids must be received via email by Steve Forrest (spforrest@hillsforrestsmith.com) and Shawn Smith (ssmith@hillsforrestsmith.com) by 2:00 PM Eastern Standard Time

(EST) on September 4, 2019. Bids will be opened privately.

Bids received after the time are late bids. Such bids will not be considered.

BIDDING DOCUMENTS

An electronic copy of the Bid Documents including construction drawings, specification and an itemized bid form have been provided.

Complete sets of Bid Documents shall be used in preparing Bids; neither the OWNER, ARCHITECT nor ENGINEER shall assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

The OWNER and ARCHITECT in making copies of the Bid Documents available on the above terms do so only for the purpose of obtaining Bids on the work and do not confer a license or grant for any other use.

ITEMIZED BID FORM

The Itemized Bid Form is attached hereto.

Itemized Bid Forms must be completed in ink, by computer. The price for each item shall be on a lump sum or unit price basis according to the Itemized Bid Form. The total price Bid for the WORK shall be the sum of the lump sum prices and the unit prices multiplied by appropriate estimated quantities for individual items and shall be stated in figures on the appropriate place on the Itemized Bid Form. In the event there is a discrepancy on the Itemized Bid Form due to the unit price extension or additions, the corrected extension and additions shall be used to determine the project Bid amount.

Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the company corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

The Bid shall contain and acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

The address to which all communications regarding the Bid are to be directed, must be shown.

BIDDER'S REQUIREMENTS

Each BIDDER must fully inform himself of the conditions related to the labor and construction under which all work shall be performed. Failure to do so shall not relieve a successful BIDDER of his obligations to furnish all materials and labor with accompanied costs necessary to complete the work in accordance with the specifications for the considerations set forth in this Bid.

BIDDERS shall not submit proposals before a careful inspection of the site has been made and the BIDDER has become familiar with local conditions, accessibility, general character of the site, labor conditions, the character and extent of existing work within or adjacent thereto, and any other work being performed thereon. A site inspection may be arranged with or through the OWNER'S Representative. The BIDDER is urged to contact the OWNER, GOLF COURSE ARCHITECT and ENGINEER for information or clarification prior to their Bid is submitted.

The BIDDER shall understand that any quantities of materials listed represent estimates provided by the OWNER or ARCHITECT to assist the BIDDER and do not necessarily reflect the actual amounts of materials that will be used on this project. The BIDDERS are to urged to prepare their own quantity take-offs for verification purposes.

The Bid shall include the complete cost of furnishing all materials, supervision, labor, equipment, insurance, taxes, freight charges and all other incidental expenses necessary to complete the WORK in accordance with the specifications.

Each BIDDER shall submit along with his Bid a Construction Schedule of planned progress of the WORK that is involved. The schedule shall be broken down by various construction phases and by calendar days. The Construction Schedule will be an integral element in the review and award of the project by the OWNER.

Each BIDDER shall submit along with his Bid the Qualifications of the Job Superintendent whom will be assigned to the project. The OWNER shall have the right to approve or disapprove the Job Superintendent based upon review of his/her qualifications. The Job Superintendent will be present at the job site during the entire progress of work and the Superintendent will not be changed without approval of the OWNER.

QUALIFICATIONS OF BIDDERS

The OWNER reserves the right of determining the qualifications of each BIDDER. The BIDDER must furnish the necessary information for this purpose as determined by the OWNER. If such information proves the BIDDER is incapable of carrying out the obligations of the contract and completing the intended work in the time allowed, the OWNER may reject the bid.

To demonstrate qualifications to perform the WORK, each BIDDER must submit with their bid an audited financial statement and their last two years tax returns to support their ability to perform the WORK, previous experience along with contact information.

Each Bid must contain evidence of the Bidder's qualification to do business in the State where the WORK is located or covenant to obtain such qualification prior to award of the contract.

Each BIDDER shall be regularly engaged in the business of golf course construction for the preceding five years and shall have satisfactorily completed at least five projects or the equivalent, unless otherwise approved by the Golf Course Architect.

The BIDDER shall be fully licensed in the State of Florida and shall comply with applicable laws, regulations, rules and ordinances of local, state and federal authorities.

EXAMINATIONS OF CONTRACT DOCUMENTS AND SITE

Before submitting a bid, each BIDDER must (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may, in any manner, affect cost, progress, or performance of the WORK, (c) understand and comply with all Federal, State and local laws, ordinances, rules and regulations that may, in any manner, affect cost, progress, or performance of the WORK; and (d) study and carefully correlate BIDDER'S observations with Contract Documents.

On prior written request, OWNER will provide each bidder access to the site to conduct such investigations and tests as each bidder deems necessary for submission of his bid.

The land upon which the WORK is to be performed, right-of-ways for access thereto, and other lands designated for use by CONTRACTOR in performing the WORK are identified in the General Conditions, Supplementary Conditions and/or Construction Plans.

The submission of a Bid shall constitute an incontrovertible representation and warranty by the BIDDER that it has complied with every requirement and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the WORK.

INTERPRETATIONS

Each BIDDER shall be thoroughly familiar with all aspects of the proposed Contract and related documents. If the BIDDER finds that any requirements contained within these documents, or, if the BIDDER is unclear with respect to the intent of the Contract Documents, the BIDDER shall request clarification by notifying the ARCHITECT in writing at least (4) four business days before Bids are due. Replies will be issued by Addenda by e-mail or facsimile to all parties recorded by ARCHITECT as having received Bid Documents. Questions received less than (4) four days prior to the date for opening of Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or

clarifications will be without legal effect.

ADDENDA

Any addenda prepared by the Project Manager prior to the Bid opening for the purpose of changing the intent of the Specifications or clarifying its meaning shall be binding in the same way as if were written in the Specifications. The failure of any BIDDER to receive such addenda will not relieve him of any obligation under this Bid Addenda must accompany this set of documents when the Bid is submitted. If the Addenda requires major changes in the scope of work, the ARCHITECT shall have the option of postponing the date set for Receipt of Bids and the Addenda shall include such information.

WITHDRAWAL OF BIDS

Bids may be withdrawn by written request received from BIDDERS prior to the time fixed for opening. Negligence on the part of the BIDDER in preparing the Bid confers no right for the withdrawal of the Bid after it has been opened. No Bids may be withdrawn for a period of 90 days after the date set for receiving the Bids.

CONTRACT TIME

The Construction Schedule submitted with this BID shall be considered in the award of this WORK. Contractor shall submit a complete Schedule for all of the WORK with bench mark dates for all categories of the WORK.

AWARD OF CONTRACT

The OWNER reserves the right, in its sole and absolute discretion, to reject any and all Bids, to waive any and all informalities and to negotiate contract terms with the Successful BIDDER, and the right to disregard all nonconforming, non-responsive or conditional BIDS. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the contract sum thereof will be resolved in favor of the correct sum.

In evaluating Bids, the OWNER may consider the qualifications of the BIDDERS and whether or not the Bids comply with the prescribed requirements. The low BIDDER may not necessarily be awarded the job.

The OWNER may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the WORK as to which the identity of Subcontractors and other persons and organizations must be submitted. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by the OWNER.

The OWNER may conduct such investigations as it deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the BIDDERS, proposed Subcontractors and other person and organizations to do the WORK in accordance with the Contract Documents to the Owner's satisfaction within the prescribed time.

The OWNER reserves the right to reject the Bid of any BIDDER who does not pass any such evaluation to the OWNER'S satisfaction, in the OWNER'S sole discretion.

If the Contract is to be awarded it will be awarded to the most qualified BIDDER as determined by the OWNER in its sole and absolute discretion whose evaluation by the OWNER indicates to the OWNER that the award will be in the best interests of the Project.

If the Contract is to be awarded, the OWNER will give the Successful BIDDER a Notice of Award by February 15th, 2020, following the membership vote in January.

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

The Agreement between OWNER and CONTRACTOR is based on a Lump Sum Contract.

When the OWNER gives a Notice of Award to the Successful BIDDER, it will be accompanied by at least three (3) unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen (15) calendar days thereafter, CONTRACTOR shall sign and deliver at least three (3) counterparts of the Agreement and attached documents to OWNER with the required Bonds. Within ten (10) days thereafter, OWNER shall deliver one fully signed counterpart to CONTRACTOR.

INSURANCE

Liability Insurance, Workmen's Compensation and Vehicle Coverage will be required to be retained in force during the Contract Period and comply with the OWNER's insurance company's requirements. An original copy of the insurance certificate, naming the OWNER and ARCHITECT as additionally insured will be provided by the CONTRACTOR prior to issuing Notice to Proceed.

Supplement sub-paragraph as follows:

"Each prime contractor shall take out and maintain during the term of this contract such public liability and property damage insurance as shall insure the Contractor and the Owner against legal liability for damages because of bodily injury, sickness, injury to, or destruction of, property caused by or arising out of operations being carried on by the Contractor or by anyone directly or indirectly employed by either of them. Also, the

Contractor shall take out and maintain, or shall cause each Subcontractor performing, or engaged to perform, work covered by this contract to take out and maintain similar public liability and property damage insurance insuring Subcontractor(s) and the Owner against legal liability for such damages caused by or arising out of the operations of such Subcontractor or caused by anyone directly or indirectly employed by such Subcontractor(s). Each such policy shall provide coverage for the additional hazards described herein."

Comprehensive Public Liability and Property Damage Insurance shall include the following provisions:

- Contractual Liability
- Contractor Contingent Liability
- Explosion, Collapse and Damage to Underground Utilities (commonly known as the XCU coverage)
- Occurrence Basic Bodily Injury and Property Damage
- Broad Form Personal Injury
- Broad Form Property Damage
- Completed operations to be kept in force until acceptance of the work by the Owner

Comprehensive Public Liability and Property Damage Insurance shall include the following provisions:

<u>Public Liability</u>	
Each Person	\$ 1,000,000.00
Each Occurrence	\$ 3,000,000.00
<u>Property Damage</u>	
Each Occurrence	\$ 1,000,000.00

Comprehensive Automobile Liability, Including non-ownership and hired car coverage, as well as owner of automobile, truck or other vehicle used in the performance of the contract.

<u>Bodily Injury</u>	
Each Person	\$ 500,000.00
Each Occurrence	\$ 1,000,000.00
<u>Property Damage</u>	
Each Occurrence	\$ 50,000.00

The insurance policy must contain the additional provision wherein the company agrees that fifteen (15) days prior to termination, expiration, cancellation or reduction of the insurance afforded by this policy with respect to the contract involved, written notice will be served by registered mail to the Golf Course Architect and the Owner.

Each prime contractor agrees that its insurance carriers waive subrogation against the Owner, its agents or employees with respect to any loss covered by the Contractor's insurance.

Workmen's Compensation Insurance: Each Contractor shall take out and maintain during the life of this contract Workmen's Compensation Insurance for all employees employed at the site of the project and, in case any of the work is sublet, the Contractor shall require the Subcontractor to provide such insurance. Proof of compliance with the Workmen's Compensation Laws and Social Security Laws shall be filed with and kept in full force and effect on file with the Owner at all times until this contract has been fully and finally completed. This shall be an absolute responsibility and duty of the Contractor who agrees to indemnify and save harmless the Owner from any contributions, taxes, or liability thereof.

TAXES

Project is subject to Federal and State of Florida Sales Taxes, which must be included in the BIDDER'S proposal.

PROPOSAL FORM

Name of Bidder:

The proposal is based on subcontracting certain major portions of the work to subcontractors as listed below:

ITEM NO.	SUBCONTRACTOR	LICENSE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

1. Bidder understands that the Owner reserves the right to reject any or all Bids and to waive any informality in the bidding.
2. The Bidder agrees that this Bid shall be good and will not be withdrawn for a period of ninety (90) calendar days after the scheduled closing time for receiving bids.
3. Upon receipt of written notice of the acceptance of this Bid, the Bidder will execute the formal contract within ten (10) days as required in **INSTRUCTIONS TO BIDDERS.**
4. The Bidder agrees to comply with stipulated guarantees and warranties

PROPOSAL FORM

BASE BID:

Total Base Bid for _____ shall be:
_____ Dollars
(\$ _____)

SUBSTITUTIONS AND ADDENDA:

Particular products have been specified to establish standards or quality; not to limit competition. However, if the CONTRACTOR intends to deviate from the specified products, he must list such deviations below as well as price adjustment, if any.

1. _____ price change (\$_____)
2. _____ price change (\$_____)
3. _____ price change (\$_____)
4. _____ price change (\$_____)

CONTRACTOR to acknowledge receipt of the following addenda:

<u>ADDENDUM #</u>	<u>PERSON</u>	<u>DATE</u>
1.		
2.		
3.		
4.		
5.		

COMPLETION:

The BIDDER agrees, if awarded the contract, to commence work within ten (10) days after the date of Notice to Proceed; and Completion shall be or about: _____.

PROPOSAL FORM

The undersigned BIDDER hereby acknowledges that he has not entered into any Agreement with any other BIDDER or prospective BIDDER or with any other person, firm, or corporation relating to the price named in said proposal or any other proposal, nor any agreement or arrangement under which any person, firm or corporation is to refrain from bidding, nor any agreement or arrangement for any act or omission in restraint of free competition among BIDDERS.

Furthermore, said BIDDER has not disclosed to any person, firm, or corporation the terms of said proposal or the price named therein.

In compliance with the terms and conditions of this Bid the undersigned agrees to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

To BIDDER, the following must be fully completed:

Dated at _____ this _____ day of _____, 20__.

Business Address of BIDDER:

Telephone Number: _____

Fax Number: _____

E-mail Address: _____

PROPOSAL FORM

SIGNATURE PAGE

SIGNATURE OF BIDDER:

BY: _____ (Manual Signature)

_____ (Typed Signature)

TITLE: _____.

COMPANY: _____

DATE: _____

SIGNATURE OF OWNER:

BY: _____ (Manual Signature)

_____ (Typed Signature)

TITLE: _____.

COMPANY: _____

DATE: _____

TEMPORARY FACILITIES

1. WORK INCLUDED

The Contractor's work shall include all labor, materials and related items necessary to complete all temporary facilities in conjunction with the construction of the new facility named on the title page, and show on the drawings or herein specified, or both, as follows:

- a. Temporary enclosures
- b. Temporary heat
- c. Temporary light and power
- d. Temporary office
- e. Temporary sheds for storage
- f. Temporary stairs, ladders, ramps, runways, etc.
- g. Temporary telephone
- h. Temporary water
- j. Temporary restrooms

2. TEMPORARY ENCLOSURES

The Contractor shall provide temporary weathertight enclosures for all exterior openings so as to protect all work from the weather as is necessary for good construction.

3. TEMPORARY HEAT

This Contractor shall, at his own expense, provide temporary heating as required for the proper protection and drying of all work.

He shall provide and pay for fuel and attendance for temporary heating.

Attendance shall be provided as required for the safety of facilities.

4. TEMPORARY LIGHT AND POWER

The Contractor shall furnish all temporary light and power, complete with all wiring, lamps, and similar equipment, as required for the completion of the project.

The Contractor shall pay for all current for temporary lighting for all trades during construction work.

5. TEMPORARY OFFICE

The Contractor shall, at all times, provide and maintain a weather tight office, where directed, for use of the Architect, Subcontractors, and Contractor. This

building shall be removed when directed.

This office shall have heating and cooling, doors with locks and tables, benches, and racks for drawings.

6. TEMPORARY SHEDS FOR STORAGE

The Contractor shall provide and maintain on the premises, where directed, watertight storage sheds for storage of all materials that might be damaged by weather.

7. TEMPORARY TELEPHONES

The Contractor shall install, at his own expense, a dedicated telephone line useable for fax machines and phone calls.

All local calls shall be paid for by the Contractor.

All long distance and toll calls shall be paid for by the party making the call.

8. TEMPORARY WATER

The Contractor will pay for all water for construction purposes that is required by all trades.

The Contractor shall use due care to prevent the waste of water, and all valves, connections, and hoses must be maintained in perfect condition at all times.

GENERAL CONDITIONS:

A.I.A. GENERAL CONDITIONS:

"The General Conditions of the Contract for Construction", Standard Form of American Institute of Architects, Document A-201, 1997 edition, Articles 1-14 inclusive, are hereby, except as the same may be inconsistent herewith, included in and made a part of these specifications.

Where any article of the "A.I.A. General Conditions" is supplemented hereby, the A.I.A. provisions of such articles shall remain in effect. All these supplemental provisions shall be considered as added thereto. Where any such article is amended, voided, or superseded hereby, the provisions of such article not so specifically amended, voided or superseded shall remain in effect.

The terms "**Architect**" and "**Golf Course Architect**" shall refer to **Hills • Forrest • Smith**, 7351 West Bancroft St., Toledo, Ohio 43615, (419) 841-8553.

SUPPLEMENTAL GENERAL CONDITIONS

Intent of the Documents

It is the intent of the specifications and drawings to describe a complete project to be constructed in accordance with the contract documents. The contract documents comprise the entire agreement between Owner and Contractor. They may be altered only by a written modification properly executed by both the Owner and the Contractor.

These documents shall be utilized to construct the golf course, practice facility and other site work as defined herein. The specifications shall govern in the event of a discrepancy.

Progress Schedule

The contractor will be required to submit their Project Schedule for approval by the Owner and/or Owner's Representative.

At a minimum, the Project Schedule shall consist of a suitable horizontal bar chart with separate lines for each major section of work or operation. This bar chart shall show the complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. This bar chart shall indicate the start and finish, dates, and duration of listed items.

The project schedule will need to be updated and provided to the Architect and Owner at the end of each month. The chart shall also indicate the estimated percentage of completion for each item of work at each submission.

Changes in the Work

The OWNER will advise of minor changes in the Work not involving an adjustment to the Contract Price or Contract Times, by issuance of a Field Order.

The Field Order shall include a detailed description of the proposed change with supplementary or revised drawings and specifications order.

The Contractor may propose a Change Order by submitting a request for change to the Architect for approval by Owner, describing the proposed change and its full effect on the Work. The Contractor shall include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation supporting the same. Any such change shall not be effective unless and until a Change Order or Work Change Directive is executed by Owner and Contractor.

For unit prices and quantities determined in the approved Schedule of Values, all costs

in a Change Order will be based on the fixed unit prices. For unit costs or quantities of units of Work which are not predetermined, Work will be performed under a Work Change Directive.

Contractor's Responsibilities

Contractor shall supervise and direct the work efficiently and with his best skill and attention. He shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. Contractor shall be responsible to see that the finished work complies accurately with the contract documents.

Labor, Materials and Equipment

Contractor shall provide competent, suitably qualified personnel to perform the construction as required by the contract documents.

Contractor shall furnish all materials, equipment, labor, transportation, machinery, tools, fuel, power, sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of the work.

Subcontractors

Contractor shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them. Nothing in the contract documents shall create any contractual relationship between Owner or Golf Course Architect and any Subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of Owner or Golf Course Architect to pay or to see to the payment of any monies due any Subcontractor or any person or organization working for the Contractor. Prior to release of final payment and retainage to Contractor and all Sub-Contractors will be required to submit a waiver of liens indicating all Sub-Contractors and suppliers have been paid any monies due.

Use of Premises

Contractor shall confine his equipment, the storage of materials and equipment, and the operations of his workmen to areas designated by the Owner.

Should it be necessary at anytime to move materials, sheds, or storage platforms, the Contractor shall move same as and when directed at his expense.

All cement, lime, and other materials affected by moisture shall be stored on platforms and protected from the weather.

Record Drawings

Contractor shall keep one record copy of all specifications and drawings at the site in good order and annotated to show all changes made during construction.

Safety and Protection

Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work and shall comply with all requirements and regulations of OSHA, Federal, State and Local governments. Contractor shall pay all fines levied by governmental agencies for non-compliance with regulations.

Site Cleanliness

Contractor shall keep the premises free from scattered debris, and any accumulations of waste materials, rubbish and other debris resulting from the work. At the completion of the work he shall remove all waste, rubbish and debris from and about the premises, as well as all tools, equipment, machinery and surplus materials and shall leave the site clean and ready for occupancy by the Owner.

As-Builts

The Contractor shall be responsible for providing to the Owner, Golf Course Architect and Golf Course Superintendent a GPS as-built depicting locations and sizes of all features (incl. greens, tees, bunkers, etc.), lake edges, existing trees, landscape beds, cart paths, drainage lines, basins and structures with elevations, and irrigation items as dictated in the irrigation specifications. The as-built will be in the form of one reproducible set of drawings as well as an electronic copy (CD) of the GPS as-built. The as-built drawings will need to be completed and provided to all said parties prior to the release of the final payment and retainage.

Warranty and Guarantee – One Year Parts & Labor

Contractor warrants and guarantees to Owner that all Materials and equipment will be new unless otherwise specified, and that all work will be of good quality and free from faults or defects and in accordance with the requirements of the contract documents. All unsatisfactory work, all faulty or defective work, and all work not conforming to the requirements of the contract documents at the time of acceptance, shall be considered defective. All defective work shall be corrected to the satisfaction of Owner and Golf Course Architect. Contractor shall also bear the expenses of making good all work of others damaged by his correction, removal or replacement of his defective work.

If, after the approval of final payment and prior to the expiration of one year after the date of completion, or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the contract documents, any

work is found to be defective, Contractor shall, without cost to Owner and in accordance with Owner's written instructions, either correct such defective work, or if it has been rejected by Owner, remove it from the site and replace it with non-defective work. If Contractor does not comply with the terms of such instructions, Owner may have the defective work corrected or removed and replaced with all costs direct and indirect being the Contractor's responsibility and shall be paid by Contractor.

Supervision of Work and Termination

Owner may, at any time and without cause, suspend the work or any portion thereof by notice in writing to Contractor. Contractor will be paid for the work performed up to the termination date. If Contractor is adjudged as bankrupt or insolvent or if he makes a general assignment for the benefit of his creditors or if he files a petition to take advantage of any debtor's act; or if he fails to perform in accordance with the contract documents; fails to pay his subcontractors or if he otherwise violates any provision of the contract and after giving Contractor seven (7) days written notice terminate the services of Contractor and take possession of the project and of all materials, equipment, tools, construction equipment and machinery thereon owned by Contractor, and finish the work by whatever method he may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until the work is finished.

SPECIAL CONDITIONS

WORK INCLUDED

The Contractor's work shall include all labor, materials and related items necessary to complete construction of the new facility named on the title page and shown on the drawings and/or herein specified.

SPECIFICATION EXPLANATIONS

For the convenience of reference and to facilitate the letting of contracts and subcontracts, these specifications are separated into titled sections. Such separations shall not, however, operate to make the Owner or arbiter to establish limits to the contracts between the Contractor and Subcontractor.

MATERIALS

When several materials are specified by name for one use, the Contractor may select for use any of those specified.

Should the Contractor desire to substitute another material for one or more specified by name, he shall state on a substitution sheet the credit or extra involved by the use of such material. He shall also provide data and samples for consideration. No such material shall be used unless approved in writing by the Golf Course Architect and Owner's Representative.

Wherever the words "approved by", "inspected by", "satisfactory to", "as directed by", "submitted to", or similar phrases are used in this specification, they shall be understood to mean that the material or item referred to shall be approved by, satisfactory to, as directed by, submitted to, or inspected by the Golf Course Architect or his authorized representative and Owner's Representative.

All manufactured articles, material and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer, unless herein specified to the contrary.

GUARANTEE/WARRANTY

The Contractor shall, in case of work performed by his Subcontractor and where guarantees are required, secure warranties from said Subcontractors and deliver copies of same to the Golf Course Architect and Owner's Representative upon completion of the work.

CONTRACTOR'S SUPERVISION

The Contractor shall give his personal supervision to the work or provide a General Superintendent acceptable to the Owner and the Golf Course Architect; he shall be responsible for all basic layout work for all materials, workmanship, transportation, scaffolding, tools, utensils, etc., for the complete and substantial construction of everything shown and described, and shall be responsible for all obstructions to the streets, drives, etc. Prime and Subcontractors shall provide an adequate number of foremen or assistant superintendents to supervise the subdivision of the work; such men are to be thoroughly experienced and capable of handling the crafts and the type of work under his supervision.

SIGNS

No signs or advertisements will be allowed to be displayed without the approval of the Owner.

TEMPORARY UTILITIES

The Contractor shall furnish all temporary light and power, complete with all wiring, lamps, and similar equipment, as required for all work during the construction period.

The Contractor will pay for all electricity for temporary lighting for all trades during construction work.

EXISTING STRUCTURES AND SERVICES

The Contractor shall notify in writing, at least one (1) week before breaking ground, corporations whose tracks, wires, pipes, conduits, or other structures may be affected by his operations.

The Contractor shall be responsible for the destruction or the disarrangement of all property of the Owner and of all public service corporations or companies due to his careless operation of any public conveyance without special permission of the Owner.

MONUMENTS

Whenever any monuments are encountered in the line of work, whether shown on the plans or not, the Contractor must notify the Owner in writing, at least twenty-four (24) hours in advance of moving same, and under no circumstances is such a stone or other monument to be removed or disturbed by the Contractor or by any of his men without a written order from the Owner, and only when a registered representative of the Owner is present.

The Contractor shall forfeit the sum of five hundred dollars (\$500.00) for each and every neglecting of this regulation, which amount is to be deducted from the final

payment as compensation for resurveying lines for resetting the monument. All monuments are to be reset by the Contractor in accordance with specifications for same.

PROTECTION OF PROPERTY

Existing trees within construction zones shall be protected to insure that no physical damage will occur to the plant. The Contractor shall, at all times, adequately protect existing and newly constructed operations of any sort and shall be responsible for correcting any and all damages to same as a result of operations. This shall be done with proper staking of these areas.

The Contractor is responsible for the protection of all property during the course of his operation and for the protection of all structures from damage. The Contractor shall repair or replace, at no cost to the Owner, any damage resulting from his operations.

Where adjacent lawn or surface areas within the project site, but outside the grading limits, are disturbed as a result of building operations or storage of materials under this contract, they shall be cleaned of all debris and restored to original grade and condition, including sprigging, re-sodding, and replacing of any damaged trees.

The Contractor shall establish and maintain "orange safety screening" around all saved specimen trees prior to commencement of any work. These screens shall be maintained until **all** work is accepted by the Architect and Owner's Representative. Safety screening shall be Conweb, smooth top, diamond safety fence, 4'x100' rolls, international orange color, and contractor's grade with metal snow fence type posts on 12' center maximum (typical).

GRADES, LINES AND LEVELS

Except for the four bench marks established by Owner, all grades, lines, and levels, and bench marks for general construction shall be established and maintained by the Contractor who shall be responsible for same.

The Contractor shall verify all grades, lines, levels, and dimensions as shown on the drawings, and he shall report any errors or inconsistencies in the above to the Golf Course Architect before commencing work.

EXISTING CONDITIONS

Existing conditions, including surface features, soil boring data, and any underground utilities shown on the plans and/or referred to in the specifications, are for information purposes only and shall not be deemed as part of the plans and specifications. It shall be the Contractor's obligation to verify and augment such information and data to fully satisfy themselves as to the conditions under which the work will be done. The Contractor shall maintain in operating condition all active utilities encountered in this

construction. He shall contact all public utilities involved and have their representatives locate their pipes, conduits or cables before construction is started. The Golf Course Architect does not assume responsibility for location or disturbance of utilities or other existing features or conditions encountered on this project. Inactive and abandoned utilities encountered in operations shall be removed to at least twelve (12) inches below or adjacent to any new work and shall be plugged and capped. Location of these operations shall be reported in writing to the Golf Course Architect and Owner's Representative. Any replacement or relocation cost shall be the Contractor's responsibility.

Where the agency having jurisdiction over a utility requires that their inspector be present at the time of crossing or working around such utility, it shall be the Contractor's obligation to notify such agency at least forty-eight (48) hours in advance of such work and pay such inspection costs as the agency may require.

SUB-SURFACE CONDITIONS

Any data concerning sub-surface materials, formations, and conditions has been obtained by the Owner for their own use and is not, and shall not be considered, a part of the contract documents. It is understood and agreed that the Contractor assumes all risks in excavating work for this project, and the Contractor shall make all necessary investigations of sub-surface conditions before submission of bid.

SITE VISITS AND WALKTHROUGH INSPECTIONS

The on-site superintendent for the Contractor shall, at all times, make the following available for use by the Golf Course Architect and Owner's Representative, during visits. Items include a paint gun with ample supply of highly visible paint, pin flags, appropriate surveying tape, an 8' long 2"x 4" timber painted white, a probe for measuring gravel, sand and mix depths and a smart tool (or equal) digital level for measuring tee and green surface slopes.

The on-site superintendent for the Contractor is expected to be present and prepared at the agreed upon location and time for the visit. The on-site superintendent for the Contractor shall be expected to take pertinent notes. The Golf Course Architect will prepare and distribute his/her site visit/field order notes within 48 hours of the site visit to the Contractor and Owner's Representative. The Contractor shall provide appropriate transportation on the site, and have shaper(s) available to attend the walkthrough. The superintendent shall make all necessary plans to be adequately prepared for the walkthrough so that time is not needlessly wasted.

The Contractor shall have and make available at all times the most current, updated set of plans, specifications and all other pertinent documentation for use in constructing the golf course. The plans are to be maintained on site and are to be kept dry and safe from moisture, wind or other conditions that may otherwise deface the documents.

The Contractor should be prepared for bi-weekly meetings with the Owner's

Representative. These meetings will consist of a review of schedules and discussion on any current issues or concerns. Minutes of these meetings will be distributed to all involved parties including all not in attendance.

CLEANUP

The Contractor shall, at all time, keep construction area, including any approved storage areas used by him, free from accumulations of waste material, loose stones, or rubbish.

Upon completion of the construction, the Contractor shall leave the work and premises in a neat, clean, and workmanlike condition satisfactory to the Golf Course Architect and Owner.

PREFACE

1. The General Conditions of the Contract for Construction and the Specification Sections A, B, C, D, E, F, G, H, I, J, K, L and M and plans prepared by the Golf Course Architect shall govern construction of the various items of work to be done.
2. The word "Architect" shall mean Golf Course Architect and shall herein apply to Hills • Forrest • Smith.

SECTION A – MOBILIZATION

Description

Mobilization shall include verification of all necessary construction permits; moving onto the site of all materials and equipment; furnish and erecting plants, temporary buildings and other construction facilities; all as required for the proper performance and completion of the Work. The Contractor will be responsible for contacting the utility companies for connections. Mobilization shall include, but not limited to the following principal items:

1. Moving onto the site of all materials and equipment required for first thirty (30) days of operations.
2. Installing temporary construction offices, temporary utilities, equipment and material compound.
3. Providing all on-site communication facilities i.e., phone, fax and radios.
4. Provide on-site sanitary facilities.
5. Arranging for and erection of work and storage yard with fencing. Multiple contractors will share a designated area for work and storage yard. Each contractor will be responsible for erecting their own fencing as necessary for the security of their equipment and materials. Owner will not be responsible for lost or stolen materials.
6. Obtaining all required construction permits.
7. Posting all OSHA required notices and establishment of safety programs.
8. Having the construction superintendent at the job-site full time.
9. Submitting any revisions to the Construction Schedule the schedule shall show start and completion dates for each task.

End of Section A

SECTION B - LAYOUT AND STAKING

The Owner shall provide the initial surveying of the golf course tee, green and dogleg points, property and subdivision boundaries, easements, right-of-ways, wetland boundaries and sufficient benchmarks. All tee, dogleg and green points are to be staked with 6" PVC pipe at a height of a minimum of a 7'. Colored banding shall designate the type of point: tees = blue, doglegs = red and greens are to be green. After boundaries and points are marked, and prior to any clearing or other construction activity, such points and boundaries shall be approved by the Architect. The Contractor shall maintain such points throughout the duration of the project. Any discrepancy from visual or physical relationships shall be reported to the Golf Course Architect and Owner's Representative.

It shall be the Contractor's responsibility to protect all stakes until the completion of the project. Re-establishment of survey points due to negligence or carelessness by the Contractor, his men or equipment, or any Subcontractor responsible to the Contractor will be executed at the Contractor's expense.

The Contractor shall visit the site to observe existing conditions. He shall take into account all parts affecting the general clearing of the site to properly commence work. He shall make an appraisal of all work required to produce a finished job. The Contractor shall take into account all buried electrical, storm, sanitary, and telephone lines.

Staking of Golf/Property Line

If a discrepancy shall occur regarding staking and/or grading, Owner reserves the right to request their surveyor to review discrepancy. Contractor shall assume costs of surveying if discrepancy is found to be at fault of Contractor.

Grade Stakes

Materials – shall be survey grade wooden lath stakes a minimum of three feet (3') long, unless approved by the Golf Course Architect.

Plastic Ribbon – Plastic colored ribbons shall be attached to the tops of stakes. A consistent flagging system shall be employed by the Contractor so that the Golf Course Architect/Owner's Representative may ascertain the meaning of various stakes.

Centerlines: Contractor shall stake the centerline of each golf hole at one hundred (100) foot stations, labeled accordingly with station point elevation and demarked with orange ribbon. One hundred (100) foot stations shall be measured from the monument representing the center of the back tee to the turning point and to the center of the green. The centerline staking shall remain throughout construction until the Golf

Course Architect deems the stakes unnecessary.

Tees: All tees shall be staked at minimum with one center stake, four (4) corner stakes. The fill at the tees shall extend a minimum of two (2) feet outside the desired perimeter to insure proper shoulder for mowing operations. The center tee stake shall be labeled with proposed elevation, distance to dogleg stake and/or distance to green stake

Landing Areas: All landing area poles shall be labeled with the hole number, design elevation and distance to center of green.

Catch Basins: All catch basins shall be staked with design elevations during rough grading and re-staked during finish operations. The final as-built documents shall locate the center of each catch basin.

The top elevation of each catch basin and the invert of each outlet pipe shall be surveyed and recorded.

End of Section B

SECTION C - SITE PREPARATION, EXCAVATION, FILLING, AND ROUGH GRADING

SCOPE

The work covered under this section consists of furnishing all labor, equipment and materials, and performing all operations in connection with removing existing trees, brush, concrete, fence posts, structures, poles, or any other features shown on the plans to be removed or encountered; rough grading of grounds including stripping, stockpiling and replacing topsoil; and the distribution of excess earth as required by plans and specifications.

MATERIALS

Topsoil – The site is mostly sand with little to no topsoil.

Fill - Fill, when and as required, shall be a good quality fill material, free from debris of any kind, shall be of a type suitable for the purpose intended, satisfactory to the Golf Course Architect and Owner, and shall be the best available on the site. If additional fill is required, it is the responsibility of the Contractor to import good quality fill material, free from debris of any kind, shall be of a type suitable for the purpose intended, satisfactory to the Golf Course Architect and Owner.

SITE PROTECTION

Existing trees within construction zones shall be protected to insure that no physical damage will occur. Specimen trees identified by the Golf Course Architect, Landscape Architect or Owner shall be protected by the use of Conwed orange safety fencing. The fencing shall be installed at 3' beyond the drip line of any designated tree specimens.

SEDIMENTATION AND EROSION CONTROL

Refer to plans prepared by the engineer.

CLEARING AND GRUBBING

The Contractor shall remove all fences, logs, trees, stumps, shrubs, other vegetation, rubbish, and other perishables or objectionable matter, including trees in the areas to be cleared. Stumps and roots between slope stakes in paved area or in cuts and in embankments three (3) feet or less in depth shall be removed to a depth of eighteen (18) inches below finished grade. Outside slope limits and under embankments more than three (3) feet deep, all trees, stumps, brush, etc. shall be cut off approximately level with the subgrade elevation (6" below finish grade), except trees and shrubs designated by the Golf Course Architect to be preserved. All debris shall be removed from the site. Wells, pits, walls, and other obstructions shall be removed to plant material to be saved.

ROTOTILLING

Prior to the start of construction, the Owner will kill and scalp all the existing turf within the limits of disturbance. The Contractor shall then rototill all areas that are to be reshaped as shown on the plans.

ROUGH GRADING

Where grading is to be done and topsoil is apparent, the topsoil will be stripped and stockpiled in a logical area where it will be out of the way and easily recovered. The depth in each case will be found by sampling, and this determined depth may then be removed to a depth of six (6) inches. If required, additional depth of topsoil may be removed upon agreement of the Owner, Architect, and Contractor. If rock is encountered in rough grading, adjustment of elevations will be made where possible. If it becomes necessary to remove rock, the Contractor shall provide a price per cubic yard for any anticipated rock removal. Otherwise, it is assumed that there will be no additional charge. Contractor shall be responsible for this determination in each case, and shall submit to the Golf Course Architect and Owner for decision on any unusual circumstance. All topsoil is to be kept free from subsoil and debris. All rubbish, stones, roots, stumps, etc., shall be burned, buried or removed from the site. All excavation shall be made as required to bring the site to rough grade six (6) inches below finish grade elevations shown on the drawings or to the subgrade of walks, drives, or other paved areas. All areas required to be filled in order to bring same to the grade shown on the drawings shall be filled to the subgrade of paved areas or to subgrade six (6) inches below finished grade as shown on drawings. Upon completion of the filling operation, the entire site shall be brought to subgrade six (6) inches below the elevations shown on the grading plan, except as may otherwise be necessary under roads, walks or other paved areas. Fills shall be free of debris and properly compacted. All debris shall be removed from the area before finish grading. All buried debris shall be outside proposed tee, green or fairway areas, or in outer rough mounds at least 3' below finished subgrade. The Contractor shall maintain adequate drainage of surface water during construction from all areas on the site. Fill shall be placed in six (6) inch layers and compacted with caterpillar tractor, tamping roller, or sheep's foot roller. Fill material in the top twelve (12) inches of the fill shall contain no stones more than four (4) inches in diameter. Fills shall be compacted with equipment approved by the Golf Course Architect and Owner. Fill in areas under roads or paved area shall be compacted to not less than ninety-five percent (95%) maximum density at optimum moisture as determined by ASTM D-698. Borrow areas, if required, in addition to proposed lake excavations and other cuts shown on the plans shall be approved by the Architect and Owner when necessary.

All tees, bunkers, greens, fairways, and other areas affecting the appearance of the course may be lowered or raised eighteen (18) inches at the direction of the Golf Course Architect. The meaning of the above sentence is that after a green, tee, or other element has been rough graded, it may have to be refined to satisfy

the design objectives of the Golf Course Architect. Material for additional fill shall be brought from an area on the site designated at that time by the Architect. Material cut in such adjustments will be placed as directed by the Golf Course Architect. No additional costs shall be incurred by the Owner for such adjustments.

TEE DEMOLITION

All existing turf (Paspalum), organic buildup plus an additional 6" (six inches) of subsoil is to be removed from the all the tees and disposed of in a bury pit with a minimum 2' (two foot) cap over it.

HAUL ROADS

All haul roads during construction shall be routed through roughs only where possible or other approved out of play areas. The contractor shall be responsible for creating a proposed haul route plan to be approved by the Golf Course Superintendent prior to commencement of construction.

FINISH GRADING

Finish grading shall be carried out as hereinafter specified under Section M – CLEANUP AND FINISH GRADING.

ADJUSTMENT FOR AN ERROR IN CONTOURING

In figuring depths or cuts or fills, contours shown on the drawings shall be assumed to be correct unless the Contractor notifies the Golf Course Architect to the contrary before any contour fill is made. No adjustment shall be made for errors of six (6) inches or less.

UTILITIES

The Contractor shall seal all utility lines or tile lines broken in the course of excavation and not required for service thereafter. If there are tile lines that need to be extended, the Contractor shall get the approval of the Architect to proceed.

BENCH MARKS

Bench marks, monuments, and other reference points shall be carefully maintained, and if disturbed or destroyed, shall be replaced as directed.

End of Section C

SECTION D – GOLF COURSE DRAINAGE

Scope

The work includes, but is not limited to, furnishing all materials, labor and equipment for trenching, installing and backfilling subsurface drain lines.

General

After the rough shaping has been approved by Golf Course Architect, drainage pipe and inlets shall be installed in locations staked by Contractor according to the drainage plans including any field modifications. Golf Course Architect and/or Owner's representative shall approve all locations, sizes and directions of runs. All discharge lines shall outlet into a lift pumping station, and/or storm water pond as described in drainage plans.

At completion of the project, the Contractor shall provide the Owner with one CD of accurate, AutoCadd formatted as-built drawings. Locations of all installed drain lines, catch basins and outlets shall be accurate with reference to existing site and golf course features. The as-built CD shall accompany the final payment requests.

Care shall be taken at all times to schedule the drainage pipe installation operations for ditches to be cut, pipe installed and the back fill layer installed during the same working day and no ditches, or partially covered pipe lines remain open to possible rainfall. All work shall be completed in a neat and orderly manner.

Catch Basins, Inline Drains and Inlets

All catch basins, inline drains and inlets shall be constructed of new, best quality material. Installation of these materials shall conform to the manufacturer's recommendations.

Materials – Risers

HDPE – *Hancor Hi-Q with Cast Iron Grates*; AASHTO M252, M294

HDPE – *ADS N-12 with Cast Iron Grates*; AASHTO M252, M294, ASTM D2412
Turf Drainage Company of America – Perma Basin PB 1800, PB 2400 and PB 3600 (phone: 800.999.2794)

Nyloplast Inline Drains

Refer to the detail drawings for catch basins and inlets at the end of this section. Any substitution of material for this item must be approved by Golf Course Architect and/or Owner.

All catch basins, and grates shall have a 12" perforated riser with gravel backfill a minimum of 12" outside of riser. The riser must be left a minimum of 18" above finished grade until it is time to grass the hole.

Materials – Solid and Perforated PVC Pipe

All pipe and fittings shall be new, of the best quality, and conform to the minimum standards for plastic drain pipe as set forth.

Solid Pipe

Hancor Hi-Q; AASHTO M252, M294

ADS N-12; AASHTO M252, M294; ASTM D2412

Perforated Pipe – 4" – 6"

ADS HDPE N-12; ASTM D2412; Circular Perforations – 4-6-8-Position; no slotted pipe allowed; 10' lengths with couplers

SDR-35; ASTM D3034; 2 row circular perforations – 4 & 8 positions

Materials – Gravel for Perforated Pipe Backfill

See Greens Construction Section

Trenching

Excavation and back filling shall be performed in a manner and sequence that will provide drainage at all times.

During excavation, materials suitable for backfilling shall be piled in an orderly manner, at a sufficient distance from the banks of the trench to avoid overloading. Overdepths shall be backfilled with previously excavated material or with materials specified for back filling. Subgrade shall then be uniformly firmed and compacted to minimum 85% proctor density.

Trenches for all drain lines shall be excavated to a width equal to twice the outside diameter of the pipe, and to a depth as is required to permit the pipe to be laid to the desired grade.

All trenches shall contain a minimum of one-half percent (0.50%) slope, unless otherwise specified by the Architect, shall be free of any debris, and shall be cleaned of loose materials and tamped to a smooth surface.

Trench Depth and Minimum Cover – A minimum cover of 18" shall be maintained on all drainage lines. A maximum depth of cover shall be according to the manufacturer's

recommendations.

All discharge trenches shall be located and connected to a positive outfall approved by Owner and Golf Course Architect.

Installation – Perforated Pipe

Perforated drain lines throughout the golf course shall be installed according to representative drawings and specifications in a herringbone or semi-herringbone fashion with no lateral lines spaced more than 20' apart. Pea gravel shall be used for backfill.

Once perforated pipe has been installed, trenches backfilled and compacted with pea gravel, the trench spoils shall be removed and disposed of in a location approved by the Owner. The spoil stockpile locations must be approved by the Architect in an out-of-play area.

It is recognized that some areas of underground water seepage can exist which may not have been discerned. Before installation of additional underground drain pipe with selected backfill, Golf Course Architect will determine by field observation with the Contractor and the Owner the lengths and locations of pipe runs needed. A Change Order will be prepared for extra work completed beyond bid form allocation. The Contractor shall be very careful to prevent excess subsoil excavation from falling into the open trenches before back filling, or being mixed with stone backfill material during back filling.

After the herringbone underdrains are installed, the trenches shall be completely backfilled with the pea gravel or crushed stone. Backfill shall be tamped or otherwise properly compacted.

All trenches that settle lower than the surrounding grade within one (1) year after installation shall be brought to the surrounding grade by the Contractor with the same type of aggregate or soil and shall be sodded or planted in accordance with the specifications for the sodding or planting and be subject to the approval of the Golf Course Architect and be at no expense to the Owner.

Installation – Solid Pipe

No stone shall be used in the discharge line trenches unless indicated by Golf Course Architect. Discharge lines, where possible shall be laid directly on a native soil base. Backfill for these lines shall be soil adjacent to the pipe and with a minimum cover of eighteen (18") inches.

Contractor shall follow all OSHA safety guidelines during installation of drain pipe.

All trenches that settle lower than the surrounding grade within one (1) year after installation shall be brought to the surrounding grade by the Contractor with the same type of aggregate or soil and shall be sodded or planted in accordance with the specifications for the sodding or planting and be subject to the approval of the Golf Course Architect and be at no expense to the Owner.

Installation – Fittings

Corrugated pipe shall be joined using the split outside coupling furnished by the pipe manufacturer.

The split couplings shall be a minimum of 8" long (for a 6" pipe) and two polyethylene (or stainless steel) bands or straps shall be fastened around the circumference of the coupling on either side of the joint.

All couplings shall be wrapped with a double thickness geotextile fabric ("Nicolon N-40" or approved equal) fastened to the pipe with duct tape.

Erosion Control

If outlined on the erosion control plans, all risers shall have erosion control devices installed according to the details. Approved methods are silt fence, curlex bales or other approved method. A piece of a perforated solid plastic pipe a minimum of 2 times the diameter of the riser installed over the riser with a gravel backfill may also be used. Gravel must be a washed pea gravel $\frac{1}{4}$ " – $\frac{3}{8}$ " in diameter and must not pass through the perforations in the riser. The erosion control device must be a minimum of twelve inches (12") above finished grade.

End of Section D

SECTION E – GOLF COURSE IRRIGATION

An allowance for irrigation has been accounted for by the Club. All repairs and retrofits will be completed by the selected golf course contractor at an agreed upon price which will be applied to the allowance.

End of Section E

SECTION F – CART PATH INSTALLATION – CONCRETE

Scope

The work shall include, but not necessarily be limited to, furnishing all materials, labor and equipment, to install cart path over the prepared subgrade and cleaning and re-grading after such installation.

General

The cart path plan shall be used in staking out the cart path. Centerlines of cart paths will be staked or pin flagged on the site by the Contractor. The Golf Course Architect and/or Owner reserve the right to revise alignment after staking to take best advantage of the lay of the land and completed golf course features. The Contractor shall get final approval of path locations from the Golf Course Architect and/or Owner, prior to paving of the cart paths.

Cart paths shall be concrete.

Standard width of cart paths shall be seven feet (7') along fairways unless specified wider by the Golf Course Architect and/or Owner.

Cart paths shall be ten foot (10') in width in high traffic areas as directed by the Golf Course Architect or Owner's representative.

Cart path parking stalls shall be ten foot (10') in depth along practice area tees as directed by the Golf Course Architect and or Owner's representative.

Curbs (practice facility area only) shall be four inches (4") x four inches (4") concrete roll curbs. Curbs shall be staked in the field by Golf Course Architect and Owner's representative and locations shall be reviewed by Golf Course Architect and Owner's representative with Contractor prior to the installation of curbs.

Cart Path Subgrade

The horizontal cross slope of the paths shall not exceed 5% unless approved by the Golf Course Architect.

The maximum percent of vertical slope of path shall be no greater than ten percent (10%).

Contractor shall grade the subgrade of the cart path in the existing soil material. The subgrade shall be graded in such a way as to ensure positive drainage off the cart

path.

Contractor acknowledges that the Golf Course Architect will not accept cart path which pools or retains water on the surface or between the path and the curb.

The Contractor shall compact to 95% of proctor density for a depth of four inches (4") using a vibratory steel wheeled roller weighing not less than five (5) tons. Owner reserve the right to test compaction using a qualified independent company. In the event that compaction does not meet the compacting requirements of 95%, Contractor shall reimburse Owner for the cost of such test and Contractor shall provide whatever works necessary to bring the applicable subgrade up to the required 95% compaction at Contractor's sole cost and expense.

The contractor will be held responsible for preparing a sufficient amount of subgrade and base in advance of placing concrete to enable work to proceed smoothly and effectively.

Materials for Concrete Cart Paths and Curbs

The work shall consist of concrete cart paths and concrete curb composed of plain Portland cement concrete constructed on a prepared subgrade in accordance with these specifications and in reasonably close conformity with the lines, grades, and thicknesses.

For the mix design, Contractor shall add to the concrete mix at the plant, Fiber mesh brand fiber reinforcement in the amount of 1.5 pounds per cubic yard of concrete. Use of fiber mesh shall be in compliance with Report Number NER-284 prepared by the Council of American Building Officials. Concrete batch tickets shall be made available at the job site and shall indicate fiber quantity in accordance with the criteria of "Specifications of Ready-Mix Concrete." Copies of all batch tickets are to be furnished to the Owner on a daily basis.

Products:

Concrete	ASTM C94 Alternate No. 2 3000 psi at 28 days 6 +/- 2% Entrained Air
Fiber mesh	1 ½ lbs. Fiber mesh/yd.
Joint Sealer	ASTM D 3405 (if necessary)
Curing Materials	ASTM C 3091 m 171, OR M182
Preformed Filler	ASTM D 1751

Equipment shall be as follows: Regular finishing equipment for finishing concrete pavements shall be mechanical, self-propelled spreading and finishing machines, and shall be capable of compacting and finishing the concrete.

Colorants

In the event that a color additive is to be mixed in the concrete, it shall be added at the plant. The colorant must be allowed ample time to mix and blend consistently through the mix during transport. Inconsistent coloring shall constitute just cause for material refusal upon delivery.

Forms

All paths and curbs shall be **hand** formed and all forms shall have a depth equal or greater than the specified thickness of the pavement. All forms shall be in sections not less than ten feet (10') in length.

Forms shall be set up to provide ample strength and adequately braced to withstand loads applied during concrete placement operations.

Forms will be set accurately to required grade and alignment following the layout establishment by Golf Course Architect. Contractor acknowledges that positive drainage off cart paths is required and Owner will not accept cart path that pools water or retains water between the path and the curb. Forms shall remain in place for a minimum of 12 hours after completion. Where necessary or indicated, drains and discharge lines approved by the Golf Course Architect will be installed by the Contractor.

Curbs shall be formed and poured as per detail.

Expansion Joints

Locate expansion joints in curb at an interval of 60 LF of pour. Expansion joints shall be one inch (1" non-asphaltic fiber board (ASTM D1751) or 1" x 4" Redwood.

Control Joint

Space control joints in concrete cart path and curb at ten feet on center maximum in eight feet wide cart path or as agreed to by Contractor and Owner where required to ensure controlled cracking. The control joints will be 1" in depth.

Placing and Finishing

Place and finish concrete in accordance with Chapter 10 or ACL 316. Deposit concrete so specified thicknesses is obtained after vibrating and finish operations. Minimize handling to prevent segregation.

After vibrating, screen and floating, test surfaces with straight edges in the longitudinal direction to required grade. Straightness of surface shall not vary over $\frac{1}{4}$ " in 10 feet.

The pavement shall be textured to provide a satisfactory surface. All curb shall receive a "broom" finish. A rough transverse broom texture shall be applied to provide a uniform rough texture.

At the request of the Golf Course Architect or Owner the Contractor will provide a test sample, with a broom finish applied for approval.

Tool edges of curbs to provide smooth, dense surface.

Stoppage of concrete shall be at expansion joints. When stoppage occurs, assembly for expansion joints shall be installed with bulkhead of sufficient section shaped to concrete section.

For concrete placed when the temperature of the air is 35 degrees Fahrenheit or below, the concrete immediately after placing in the forms shall have a temperature between 50 and 80 degrees Fahrenheit. The sub grade of base shall be entirely free from frost when concrete is deposited.

Before the concrete has taken its initial set, the edges of the curb along each side shall be worked with an approved tool and rounded to a radius of one-fourth inch. The edges along each side of an expansion joint shall be rounded to a radius of one-eighth inch. All tool marks left by the edging shall be eliminated.

Immediately after the finishing operations have been completed and after the free water has evaporated from surface, the concrete shall be cured by spraying thereon a uniform application of curing membrane in such a manner as to provide a continuous film without marring the texture of the surface. A minimum of one gallon of material shall be used for each 200 square feet of surface. Curing material shall be thoroughly agitated immediately prior to use.

When forms are used, the pavement edges shall be coated with the curing materials as soon as the forms are removed. Any areas of pavement film that may have been damaged shall be resprayed during this operation.

Curing may also be accomplished by means of water curing with wet burlap cloth, waterproof paper or polyethylene sheeting. Curing shall be applied as soon after the finishing operations as possible without marring the surface texture.

The Contractor shall be responsible for protecting the concrete from freezing. The above requirements are minimum requirements only. Any concrete showing injury or damage due to inadequate or improper curing shall be repaired or replaced by the Contractor at no additional cost.

The concrete pavement surface shall be constructed to a tolerance of one-fourth inch in ten (10') feet in both longitudinal and traverse directions. Sections of curb containing depressions that cannot be corrected by grinding shall be repaired or replaced by the Contractor.

Concrete shall test 3,000 PSI after 28 days. Owner may test concrete as deemed necessary at Owner's expense, and Contractor shall pay for concrete testing if samples fail. All un-passable concrete shall be removed and replaced at Contractor's expense.

Delivery of Concrete

Suppliers of concrete shall have a plant of sufficient capacity and adequate transit – mixing or agitator truck facility to ensure continuous delivery at a rate required and shall schedule commitments to avoid conflicting simultaneous operations.

Frequency of delivery at site of work must be such to permit continuous, uninterrupted placing of concrete throughout the scheduled placement.

Discharge at site must be within 90 minutes after water is introduced into a mixer if ambient temperature is less than 90 degrees Fahrenheit. If ambient temperature is more than 90 degrees Fahrenheit, reduce mixing time proportionately.

Concrete truck wash site shall be located by Owner's representative. Clean-up shall be made by Contractor before completion of scope of work.

Haul Roads

The Contractor shall necessarily establish construction roads in and around the work site. These roads shall be established to minimize damage to adjacent property. The Contractor shall inform the Golf Course Architect and Owner's representative as to the location of intended haul roads prior to commencing work. Such haul roads shall not violate local regulations as to crossings of sensitive areas.

Haul roads shall not be along paved streets. Equipment may be permitted to cross paved streets at approved locations and as restricted by local regulations if the pavement is protected by an earthen or other approved pad constructed and removed at Contractor's expense. Any damage to paved streets caused by Contractor shall be repaired at Contractor's expense.

Haul roads shall be kept in a passable, well-drained condition throughout the construction period and shall be usable by all Contractors or Subcontractors working on the project.

Upon completion of this section of the work, Contractor shall remove all haul roads and

reduce compaction to a maximum of 80 -85% unless otherwise directed by the Golf Course Architect or Owner's representative. All haul roads shall be reconditioned and grassed as necessary, unless otherwise directed by the Golf Course Architect or Owner's representative, to return all affected areas to original condition and approved by the Owner's representative.

Cleanup

Contractor shall be responsible for cleanup, including hauling from the site debris and any excess materials, i.e. Asphalt, concrete, wood forms, nails, etc. Contractor shall regrade each side of the cart path so that smooth contours are achieved when blending the grade of the cart path to the existing grade. Contractor shall strive to return this area to as natural looking as possible and to allow vegetation, where necessary, along the shoulders. Surface drainage must be maintained at all times.

SCOPE - ASPHALT ROAD (SERVICE ROAD)

Construction and Equipment

The Contractor shall protect the pavement against damage from all courses, or repair or replace any part of the pavement that is damaged at the Contractor's own expense.

Provisions shall be made to minimize hauling trucks from tracking tack coat onto the adjacent pavement. The paving unit shall be a self-contained, power propelled unit capable of spreading the mixture true to line, grade and cross slope. It shall be equipped with a screed or strike off assembly that can produce a finished surface of the required smoothness and texture. Rollers shall be self propelled, reversible, steel wheeled or pneumatic tires. The tires shall be inflated at the operating pressure, and not differ in pressure greater than 5 psi, as specified by a manufacturer's table provided by the Contractor.

Weather

The base shall be clean and dry and approved by the Engineer before HMA paving begins. The pavement shall be placed only when the ambient air and surface temperature is at least 40 degrees F and rising for surface courses and at least 32 degrees F and rising for base courses.

Clearing and Grubbing

Clearing within the construction area includes removing and disposing of trees, brush, shrubs, vegetation, rotten wood, rubbish, and fences. Grubbing is removing from the ground and disposing of all stumps, roots and stubs, brush and debris. The limits of clearing and grubbing include the construction area and all ditch areas and stream or channel areas.

Subgrade Preparation

This work consists of the preparation, protection, and maintenance of the subgrade prior to the construction of any succeeding courses. After the cart path excavation and embankments have been completed, the subgrade shall be fine graded and compacted to a density not less than 97 percent of maximum dry density. All manholes, valve boxes, inlets, and other appurtenances within the area to be paved shall be adjusted to grade as directed by the Engineer. All soft and unstable material and any other portions of the subgrade that will not properly compact shall be removed, disposed of, replaced with suitable material, and compacted. The subgrade surface shall be brought to line and grade and shaped to the specified cross section. It shall be compacted and smoothed over its full width by the use of an approved, smooth faced steel wheeled roller or by mechanical tampers and vibratory compactors if rolling is not feasible. The Contractor shall take precautionary measures to prevent damage by heavy loads or equipment. If traffic, including construction equipment, is allowed to use the subgrade foundation or preceding layer, it shall be distributed over the entire width of the course to aid in obtaining uniform and thorough compaction. If ruts are formed they, shall be removed by re-shaping and re-compacting the affected area.

Aggregate Base Course

Construction shall not take place during precipitation. When precipitation has occurred during the previous 24 hours, the Engineer will determine if the subgrade is sufficiently dry. The base material (12" of Type B Stabilization LBR 40 followed by 6" of Limerock Base LBR 100) shall be uniformly spread without segregating the coarse and fine particles, in layers of approximately equal thickness, to provide the specified planned depth of sixteen inches (16"). The surface materials shall be compacted and smoothed over its full width using a smooth faced steel wheeled roller or, if rolling is not feasible, by mechanical tampers and vibratory compactors as approved by the Engineer. Immediately after placement, the base material shall be compacted to the required density. During compaction operations, the moisture content of the material shall be maintained within 2 percent of the materials optimum moisture. The gravel base shall be compacted to a density not less than 95 percent (95%) of the maximum dry density.

Hot Mix Asphalt (HMA) Placement

The surface of each layer shall be cleaned and, if necessary, retacked to provide bond with the succeeding course. If bumps or other significant irregularities appear or are evident in the intermediate course or other lower course, they are to be corrected before the final lift is placed.

HMA mixtures shall not be placed on a wet or damp surface and shall not be placed when the temperature of the road surface is less than shown in the table below. The Engineer may further limit placement if, in the Engineer's judgment, other conditions

are detrimental to quality work. HMA mixtures shall not be placed after November 15, except with approval of the Engineer.

ALL BASE AND INTERMEDIATE COURSE LIFTS OF HMA MIXTURES	
Nominal Thickness - inches (mm)	Road Surface Temperature, °F (°C)
1 1/2 (40)	40 (4)
2 - 3 (50-80)	35 (2)
Over 3 (Over 80)	25 (-4)

ALL SURFACE COURSE LIFTS OF HMA MIXTURES	
Nominal Thickness - inches (mm)	Road Surface Temperature, °F (°C)
1 (30)	50 (10)
1 1/2 (40)	45 (7)
2 and greater (50 and greater)	40 (4)

When placing the mixture, the forward speed of the finishing machine shall be at a rate to provide a continuous uniform operation with the least amount of stopping.

A wire or string line shall be used to guide the finishing machine and to maintain alignment. Edge alignment irregularities shall be corrected by hand methods immediately after they occur.

The total thickness of is to be one and a half inches (1.5"). Spreading of the mixture shall be at such a rate that, when compacted, the layer(s) will be substantially of the thickness and dimensions required to produce the required thickness. The minimum layer thickness shall be based on the following:

Design Mix Size - inches (mm)	Minimum Lift Thickness - inches (mm)
3/8 (9.5)	1 (25)
1/2 (12.5)	1 1/2 (40)
3/4 (19)	2 (50)
1 (25)	3 (75)

The compacted thickness of the top layer shall not be greater than 3 inches (75 mm). This restriction shall not apply to HMA shoulders. The maximum compacted thickness of lower layers may exceed 4 inches (100 mm) if it is demonstrated that the thicker layers have satisfactory density. The riding characteristics of the thicker

layers shall be within reasonably close conformance to that expected from a 3 inch (75 mm) layer. Each layer shall be completed to full width before succeeding layers are placed.

While operating on the road surface, use of kerosene, distillate, other petroleum fractions, or other solvents, for cleaning hand tools or for spraying the paver hopper will not be permitted. Containers of cleaning solution shall not be carried on or near the paver. When a solvent is used, the paver shall not be used for at least 5 hours after this cleaning. The Contractor shall be responsible for collecting and removing all cleaning materials and cleaning residue from the project and plant site. The cleaning material and residue shall become the property of the Contractor.

Whenever practicable, all mixtures shall be spread by a finishing machine. Irregular areas may be spread by hand methods. The hot mixture shall be spread uniformly to the desired depth with hot shovels and rakes. Loads shall not be dumped faster than they can be spread properly. Workers shall not stand on the loose mixture while spreading. After spreading, the hot mixture shall be carefully smoothed to remove all segregated coarse aggregate and rake marks. Rakes and lutes used for hand spreading and smoothing shall be of the type designed for use on HMA mixtures.

Haul Roads

The Contractor shall necessarily establish construction roads in and around the work site. These roads shall be established to minimize damage to adjacent property. The Contractor shall inform the Golf Course Architect and Owner's representative as to the location of intended haul roads prior to commencing work. Such haul roads shall not violate local regulations as to crossings of sensitive areas.

Haul roads shall not be along paved streets. Equipment may be permitted to cross paved streets at approved locations and as restricted by local regulations if the pavement is protected by an earthen or other approved pad constructed and removed at Contractor's expense. Any damage to paved streets caused by Contractor shall be repaired at Contractor's expense.

Haul roads shall be kept in a passable, well-drained condition throughout the construction period and shall be usable by all Contractors or Subcontractors working on the project.

Upon completion of this section of the work, Contractor shall remove all haul roads and reduce compaction to a maximum of 80 -85% unless otherwise directed by the Golf Course Architect or Owner. All haul roads shall be reconditioned and grassed as necessary, unless otherwise directed by the Golf Course Architect or Owner's representative, to return all affected areas to original condition and approved by the Owner's representative.

Cleanup

Contractor shall be responsible for cleanup, including hauling from the site debris and any excess materials, i.e. Asphalt, concrete, wood forms, nails, etc. Contractor shall regrade each side of the cart path so that smooth contours are achieved when blending the grade of the cart path to the existing grade. Contractor shall strive to return this area to as natural looking as possible and to allow vegetation, where necessary, along the shoulders. Surface drainage must be maintained at all times.

END of Section F

SECTION G – GREENS CONSTRUCTION

All greens will be rebuilt with new drainage.

Scope

The work includes, but is not limited to, furnishing all materials, testing, labor and equipment for the construction of all greens. It also includes installation of subsurface drain lines; sampling, testing placing and spreading materials for greens mix, all in accordance with this item and applicable drawings and subject to the terms and conditions of the contract. Preliminary shaping and greens subgrade shall have been completed by Contractor and approved by Golf Course Architect and/or Owner.

Demolition

The Contractor is responsible for removing and disposing of the existing drainage, liner, gravel and mix of the existing greens prior to the construction of the new green. The mix and gravel (buried) can be lost on site but all other materials shall be disposed of offsite.

Sampling and Testing – 90/10 Greens mix (Canadian Peat)

All greensmix and gravel is to be supplied by Golf Agronomics Supply Handling (GASH)

All material shall conform to the latest USGA recommendations. Greens mix and gravel shall be tested and approved, at contractor's expense, by an approved USGA Physical Soil Test Laboratory. The approved lab for testing is: **Brookside Laboratories** or equal.

Samples shall be submitted in ample time to receive approval or disapproval before ordering. Note: It is imperative that gravel and greens mix be submitted together so that the laboratory can determine if all materials conform to the requirements of USGA Greens section. The Contractor is responsible for all sample testing costs.

Once a mixture has been approved any material brought on site and fails testing shall be removed from the site at Contractor's expense and any payment of said failed material shall be back charged to the Contractor.

Contractor shall be certain that sand suppliers have insurance and/or be bonded to assure all materials delivered for greens mix materials construction conform to the recommendation of the physical soil test laboratory.

Samples shall be taken from the center of each pile by laterally inserting a one to one and one-half (1-1 ½ ") PVC pipe, twenty feet (20') in length, Into the pile until the pipe has reached the approximate center. Core material from the innermost part of the pile

shall be placed in a container (one container per pile). Remaining core material shall be disposed of prior to taking the next sample. A minimum of four (4) samples per pile shall be taken.

Once samples taken have been thoroughly mixed in the container, sufficient material to fill a one-gallon Ziploc plastic bag shall be gathered and sealed in such a bag, then inserted into a second Ziploc bag for shipment to the testing lab. All submitted samples must be properly labeled.

The same procedure which shall have been used to gather samples from the individual material piles shall be used to obtain samples of the greens mix to be used.

The Contractor shall send material quality control test results for all materials (sand, peat, gravel, and greens mix) to the Owner's representative. These reports shall include, but not be limited to, a current, new report from the approved soil testing laboratory for each material. Soil reports from labs must be current and represent the materials for which the Contractor wishes to bill for payment, the test must have been made in the same month that the bill represents. This ensures that testing is an ongoing process, or the Contractor will not be paid for the material.

Contractor shall provide such reports, certifications, warranties, laboratory analysis or other data as may be required by the Owner and Golf Course Architect to verify the quality of materials provided.

The Contractor's bid shall include any and all fees for the required greens mix testing, gravel testing, sand testing, choker layer testing and organic material (peat Moss) testing. The Owner is not responsible for any laboratory testing fees. The Owner is not responsible for any sampling costs, or costs for mailing or shipping of any samples. Sampling and testing are the Contractor's financial responsibility to ensure materials are at all times in compliance with the USGA recommendations and/or these specifications. Owner retains the right to hold Contractor's payment for material installation in the event laboratory testing fees have not been paid. Owner will deduct cost of laboratory fees plus 10% processing fee if it becomes necessary for Owner to pay laboratory directly. The Owner shall have the right to verify the price of all materials furnished and the Owner may also purchase any or all of the materials directly and deduct the price of these materials from the Contract price (See Unit Prices for Materials Only in Bid Proposal).

Material Installation – Subsurface Drainage

After the greens subgrade has been established, mirrors the finish grade and is approved by the Golf Course Architect and/or Owner, under-drains shall be installed. The Contractor shall paint out the proposed drainage pattern on each green. This pattern must be inspected and approved by the Golf Course Architect and/or Owner's representative prior to commencing trenching.

Drain lines throughout the putting greens shall be installed according to the latest USGA Greens Section specifications in a herringbone or perpendicular fashion with no lateral lines spaced more than fifteen feet (15') apart. The subgrade grid drawing shall be used to predict the direction of flow and maximize the layout of lateral drain lines running perpendicular to flow as much as reasonably possible. At all subgrade discharge points "smile" interceptor drain lines shall be installed to prevent water from settling against cavity wall.

All pipe and fittings shall be new, of the best quality, and conform to the minimum standards for plastic drain pipe. Perforated and solid pipe shall be 4" smooth double-walled ADS "N-12", Hancor Hi-Q or approved equal.

Perforated drain pipe shall be placed on a minimum two inch (2") firm bed of washed **Miami 89 gravel** ¼" to ⅜" (2mm to 6mm) in diameter. Aggregate shall be used for backfill and must be approved by soil test laboratory as specified in this item. Soft limestones, sandstones or shales are not acceptable. Materials should be tested for weathering stability using the *sulfate soundness test* (ASTM C-88). A loss of material greater than a 12% by weight is unacceptable. The gravel shall be hard and sound and shall have the *LA Abrasion test* performed for mechanical stability to withstand ordinary construction traffic. The value obtained using this procedure should not exceed **40**. This gravel shall be the same gravel approved for 4" gravel layer. See Appendix A at the end of this section.

Excavation and backfilling shall be performed in a manner and sequence that will provide drainage at all times. During excavation, materials suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading. Over-depths shall be backfilled with previously excavated material or with materials specified for backfilling. Subgrade of trench shall then be uniformly firmed and compacted to minimum 85% proctor density.

Trenches for drain lines shall be excavated to a width equal to twice the outside diameter of the pipe and to a depth as is required to permit the pipe to be laid to the desired grade. No lips shall be left on trenches which would prevent surface water movement into the ditches.

All trenches shall contain a minimum of one-half percent (1/2%) slope, shall be free of any debris, and shall be cleaned of loose materials and tamped to a smooth surface. Trenches shall be inspected by the Owner's Representative before stone and pipe are placed in trenches. There shall be no objects such as rocks, limbs or organic material located within trenches which would impede the natural flow of water.

The spoils from trenches shall be removed from the subgrade and disposed of in an orderly manner approved by Golf Course Architect. After the spoils are removed, areas between drain trenches shall be regraded and raked smooth, by hand, to maintain the integrity of the approved subgrade. All spoils shall be removed from the cavity of the green.

The Contractor shall be very careful to prevent excess subsoil excavation from falling into the open trench before backfilling, or from being mixed with stone backfill material during backfilling. All trench spoils shall be removed from the green shell. The subgrade shall be maintained in its original condition.

Each green drainage trench shall have four inch (4") perforated plastic drain pipe laid in a trench a minimum of twelve inches (12") wide and a minimum of twelve inches (12") deep. The main drain line shall consist of a six inch (6") perforated plastic drain pipe laid in a trench a minimum of twelve inches wide (12") and twelve inches deep (12"). Two inches (2") of aggregate shall be placed in the trenches. The plastic drain pipe shall then be placed in the center of the trench with perforations laying on the underside of pipe and shall be bedded firmly on the bottom course of aggregate. All perforated drain pipe fittings are to be duck taped tightly to the pipe. No fabric is permitted. A #14 wire shall be placed in the trench with each drain line, as well as with discharge lines, the flush out line and around the perimeter of entire green cavity wall, for ease of location. After the perforated under drains are installed, the trenches shall be completely backfilled with the approved pea gravel or crushed stone. Backfill shall be tamped or otherwise properly compacted. Gravel stockpiles will be strictly prohibited in the green approaches. All stockpile locations must be approved by the Owner.

Care shall be taken to schedule the drainage pipe installation operations for the ditches to be cut, pipe installed and the back fill layer installed during the same working day so that no ditches, or partially covered pipe lines remain open to the possible rainfall. All work shall be done in a neat and orderly manner. If gravel layer covering the pipe is not installed in the same day, trenches shall be covered with an approved filter fabric and/or crown the gravel backfill two – three inches (2"-3") above subgrade to protect the gravel from sediment washing into trenches. Fabric or excess gravel shall be removed prior to installation of the four inch (4") gravel layer.

The upper ends of all main drain pipes shall be equipped with a tee joint or elbow to the surface grade. These joints shall be capped at their openings at the time of installation. This arrangement will enable the drain line to be flushed in the event of its becoming clogged. This will allow for easy access to green flush outs for final inspection. **Note:** All greens will be flushed and checked by the Contractor and the Owner prior to the release of retainage. All flushouts shall be covered with an Ametek, or equal, six inch (6") Round Valve Box.

All discharge pipes beyond the green cavity wall shall connect into a drain inlet or outfall to a lake. All discharge pipes shall be solid with a minimum of eighteen inches (18") of cover. Maximum depth shall be according to the pipe manufacturer's specifications. Discharge lines shall be laid directly on the clean, formed and properly sloped ditch bottom. Backfill for these lines shall be material excavated from the trenches and shall be clean of any rock or gravel larger than 1" in diameter.

All trenches that settle lower than the surrounding grade within one (1) year after installation shall be brought to the surrounding grade with the same type of aggregate by the Contractor and shall be sodded or planted in accordance with the specifications for the sodding or planting and be subject to the approval of the Golf Course Architect and be at no expense to the Owner.

The Contractor shall provide the Owner accurate drawings scaled (1"=30'-0") of all installed drain lines. Locations shall be accurate with reference to existing site features and drainage drawings. As-built drawings shall accompany the final payment requests.

Material Installation – Gravel Layer

After completion of subsurface drainage installation, the subgrade shall be staked. There shall be a minimum of two (2) stakes per 1,000 square feet.

The stakes shall be graded in 4" and 16" increments from the subgrade for the gravel layer and greensmix finished grades. These stakes shall remain in place until completion of the greensmix installation. These stakes shall assist the operators with the correct placement of these materials.

After all underdrains have been installed and backfilled, the subgrade shall be smooth graded and compacted back to the originally approved subgrade. Cavity walls shall be regraded to near vertical condition prior to installing the gravel layer. A layer of washed **Miami 89 gravel** 1/4" to 3/8" (2mm to 6mm) in diameter shall be placed to a uniform thickness of four inches (4") over the subgrade. Soft limestone's, sandstone's or shales are not acceptable. Materials should be tested for weathering stability using the *sulfate soundness test* (ASTM C-88). A loss of material greater than a 12% by weight is unacceptable. The gravel shall be hard and sound and shall have the *LA Abrasion test* performed for mechanical stability to withstand ordinary construction traffic. The value obtained using this procedure should not exceed 40. This gravel shall be the same gravel approved for subsurface drainage backfill. See Appendix A at the end of this section. Care shall be taken in placing this layer of gravel or crushed stone to avoid any infiltration of subgrade materials into gravel backfill of underdrain trenches.

Spilled and excess stone shall be removed and disposed of in an area approved by the owner on-site.

Locations of the gravel stockpiles shall be in the out-of-play areas.

Greens Mix Materials – Sand

Greens mix is to be the 90/10 (Canadian Peat) mix to a depth of twelve inches (12").

Sand for incorporation in the greens mixture on all putting surfaces shall be a clean,

screened and washed, sand. Samples shall be submitted to the Golf Course Architect and Owner for approval prior to its use and accompanied with test result. Sand shall conform to the following sieve size analysis and be approved by the USGA Soil Test Laboratory and the Golf Course Architect and Owner. Both the gravel and sand shall be tested together for bridging, permeability and uniformity. See Appendix A at the end of this section. The Golf Course Architect and/or Owner reserve the right to approve or reject the sand source and blender based upon the results from the USGA Soil Test Laboratory.

The sand shall meet the Owner's recommendations for a particle size analysis that eliminates the 2mm particle size and a maximum of 5% passing the 1mm particle screen and must also meet USGA recommendations. See Appendix B at the end of this section. The greensmix shall have a minimum percolation of fifteen inches **(15") per hour**, at 30cm tension after compaction, in the standard USGA Test.

In the event a sand meeting the requirements as stated in section above cannot be found, the sand used will be in accordance with the latest United States Golf Association (USGA) recommendations in effect at the time of construction. See Appendix C at the end of this section.

A soil blending company approved by the Owner's Representative and shall be contracted by the Contractor to blend the greensmix. Each ingredient must be checked at the blending site prior to mixing. The Contractor shall have had the results of the greens mix materials analysis supplied to the Golf Course Architect and Owner prior to production blending. Calibration test results must be approved by the Golf Course Architect and Owner prior to production blending occurring. Quality control testing (by the Owner approved lab) shall be performed in the field on raw materials prior to blending of the rootzone mix. The Contractor shall supply the results of the raw materials tests to the Golf Course Architect and Owner.

The materials shall be mixed off site of the greens in one central location. Mixing of the greensmix shall be accomplished by blending the materials in the proper ratio. The USGA approved testing laboratory will provide tolerance specifications for the approved blend. The Contractor, accompanied by the Owner, will provide quality control tests including:

1. Particle Size Analysis (ASTM F-1632), including % organic matter content.
2. Physical Properties (ASTM F-1815-97) during production of the first 500 tons, and thereafter, a minimum of every 1,000 tons. The Contractor shall release the lab to provide results of all materials submitted. The blending must produce a greens mix consistent with the sample approved by the Owner within the tolerances from the lab. No additional money will be awarded to the Contractor for other methods of greensmix blending.

The final mix must be approved by the Owner's Representative prior to placement on

the gravel subgrade. The Contractor will be responsible for all testing costs.

Material Installation – Greensmix

Once the subgrade of the green is completed and subsurface drainage has been installed, a twelve (12") inch compacted deep blanket of greensmix shall be spread in the green cavity. The greensmix shall be placed being careful not to disturb the subgrade or subsurface drainage. The greensmix shall be compacted to a minimum 85% proctor density test while placing on the green area. The contractor shall provide a person to hand-water the mix while it is being spread into the cavity of the green to help achieve the desired compaction.

After hauling from the mixing location, it is desirable for the greensmix to be dumped by the collar perimeter in the interior of the green well and gravel base and then be spread to the proper depth. **No trucks shall be allowed to back into the green cavity.** A small crawler tractor with blade or other approved equipment may be used to push the greensmix onto the green. Care shall be taken that the tractor always be operated with its weight on the soil mix in a back and forth motion minimizing the possibility of disturbing the lower profile. If during the operation, the Contractor disturbs the sub-base, he shall repair it to the satisfaction of the Golf Course Architect. The greensmix shall be carefully distributed from the collar perimeter toward the center of the green to the desired depth. **NO rubber tire equipment shall be used in the initial spreading of the greensmix.**

Great caution shall be exercised at all times in order not to disturb any of the subsurface drainage or the features related to the putting green surface. To prevent damage to the subsurface drainage, the entry for the greensmix dumping shall not be over the drainage outfalls of the green.

Grade stakes shall be positioned in order to maintain the desired contours and to serve as a guide for equipment operators in keeping heavy equipment from crushing tile lines. A minimum of two (2) stakes per 1,000 square feet shall be required. It is the Contractor's responsibility to insure a minimum *compacted* soil mixture depth of twelve (12") over the entire green.

Once the soil has been spread uniformly over the surface of the putting green, it shall be compacted or firmed uniformly by mechanical means or by "footing". A roller is not satisfactory as it "bridges" soft spots. "Footing" or trampling the surface will best eliminate soft spots. A walk-behind vibratory compactor may be used to help achieve the desired compaction. Raking the surface and repeating the footing operation will result in the planting bed being uniformly firm. Repeated water settling will be required to ensure complete compaction.

Greens-mix shall be utilized to adjust grades to ensure a smooth transition from the surrounds into the final contours of the putting surface.

Appendix A

Sand and Gravel Bridging Criteria

Performance Factors	Recommendation
Bridging Factor	$D_{15} \text{ (gravel)} \leq 5 \times D_{85} \text{ (root zone)}$
Permeability Factor	$D_{15} \text{ (gravel)} \geq 5 \times D_{15} \text{ (root zone)}$
Uniformity Factors	$D_{90} \text{ (gravel)} / D_{15} \text{ (gravel)} \leq 2.5$
	No particles greater than 12 mm
	Not more than 10% less than 2 mm
	Not more than 5% less than 1 mm

Appendix B

Owner's recommended particle size distribution for sand in the final greensmix

Screen Size	Per Cent Passing
No. 10 (2mm)	100
No. 18 (1mm)	95
No. 35 (0.50mm)	75-85
No. 60 (0.25mm)	10-20
No. 100 (0.15mm)	0-5
No. 270 (0.05mm)	0-3

Appendix C

USGA recommended particle size distribution of sand in final greensmix

Name	Particle Diameter	Recommendation (by weight)
Fine Gravel	2.0 – 3.4 mm	Not more than 10% of the total particles in this range, including a maximum of 3% fine gravel (preferably none)
Very Coarse Sand	1.0 – 2.0 mm	
Coarse Sand	0.5 – 1.0 mm	Minimum of 60% of the particles must fall in this range
Medium Sand	0.25 – 0.50 mm	
Fine Sand	0.15 – 0.25mm	Not more than 20% of the particles may fall within this range
Very Fine Sand	0.05 – 0.15mm	Not more than 5%
		Total particles in

Silt	0.002 – 0.05mm	Not more than 5%	This range shall not exceed 10%
Clay	Less than 0.002mm	Not more than 3%	

The root zone mix shall have the properties summarized in the table below, as tested by USGA protocol (proposed ASTM Standards).

Physical Property	Recommended Range
Total Porosity	35 – 55%
Air-filled Porosity (at 40 cm tension)	15 – 30%
Capillary Porosity (at 40 cm tension)	15 – 25%
Saturated Conductivity	
Normal range:	6 – 12 inches/hr (15-30 cm/hr)
Accelerated range:	12 – 24 inches/hr (30-60 cm/hr)
Organic Matter Content (by weight)	1% - 5% (ideally 2% - 4%)

END of Section G

SECTION H – TEE CONSTRUCTION

The existing turf, organic matter and six inches (6”) of subsoil are to be removed and disposed of in a bury pit with a minimum two foot (2’) cover. Four inches (4”) of clean soil shall be brought in and compacted and two inches (2”) of mix shall be installed on top to serve as the base for the new tees.

Scope

The work includes, but is not limited to, furnishing all materials, labor and equipment for the installation of a sand cap and the “laser-leveling” of all tee finish grades.

Materials – Tee Mix

Tee mix is to be an 80/20 sand/peat blend supplied by Golf Agronomics Supply Handling (GASH).

For any rebuilt tees, the tee mix proposed for use on the tees must be tested by the approved labs as a possible substitute for greensmix. The mix shall have a minimum Saturated Hydraulic Conductivity of fifteen inches **(15”) per hour** at 30 cm tension after compaction in the standard USGA Test. The alternate shall have a minimum Saturated Hydraulic Conductivity of six inches **(6”) per hour** at 30 cm tension after compaction in the standard USGA Test.

Grade Preparation

The Golf Course Architect and/or Owner’s representative must approve the shape, size, elevation and alignment of all tees prior to the installation of the materials for tee construction. All shaping adjustments to the tees must then be completed and approved prior to material installation.

The tees tops shall be pitched at three quarters percent (0.75%) to the low side of the tee.

Finish Grading

Once the native soils have been spread uniformly over the surface of the tee, it shall be compacted or firmed uniformly by mechanical means or by “footing”. A roller is not satisfactory as it “bridges” soft spots. “Footing” or trampling the surface will best eliminate soft spots. A walk-behind vibratory compactor may be used to help achieve the desired compaction. Raking the surface and repeating the footing operation will result in the planting bed being uniformly firm. Repeated use of water will be required to ensure complete compaction.

All tee finish grades shall be made smooth by “laser-leveling” with a grading type tractor, with a laser-guided box blade followed by a Sand-Pro, or equal, with drag mat. The final surfaces shall be free from all water-holding depressions or pockets. The

location, elevation, shape and size of tees will be per the plans or as directed in the Rough Shaping operation. The Golf Course Architect reserves the right to adjust the tee, as outlined in the Rough Shaping specifications. Please refer to the Rough Shaping – Tee specification section for additional information.

END of Section H

SECTION I – BUNKER CONSTRUCTION & SAND INSTALLATION

Scope

The work covered by this section includes, but is not limited to, furnishing all materials, labor and equipment for installing subsurface drainage, and bunker sand. Subsurface drainage and bunker sand shall be installed according to the latest USGA Greens section recommendations. Bunker clean out and edging shall have been performed by the Contractor and approved by the Golf Course Architect, according to Cleanup and Finish grading specifications, prior to commencement of bunker construction.

Sampling and Testing – Gravel and Sand

The bunker sand shall be G-Angle.

The waste area sand and practice range target bunkers shall be 131 screenings.

All materials shall conform to the latest requirements of the USGA Greens Section. Bunker sand and gravel shall be tested and approved by an approved USGA Physical Soil Test Laboratory. The approved lab for testing is: **Hummel & Co., Inc.**, 35 King St., PO Box 606, Trumansburg, NY 14886, ph: 607.387.5694. Aggregate for subsurface drainage installation shall be either a washed crushed stone or pea gravel ¼" to 3/8" (2mm to 6mm) in diameter. Soft limestones, sandstones or shales are not acceptable. Materials should be tested for weathering stability using the *sulfate soundness test* (ASTM C-88). A loss of material greater than a 12% by weight is unacceptable. The gravel shall be hard and sound and shall have the *LA Abrasion test* performed for mechanical stability to withstand ordinary construction traffic. The value obtained using this procedure should not exceed **40**. The gravel shall have a bridging test performed with the bunker sand and shall meet the criteria in Appendix A at the end of this section.

Formal bunker sand shall be free of all soil, stones, or any extraneous material whatsoever. It is essential that laboratory testing be done to ensure proper particle size distribution. All sand should pass through a No. 16 mesh screen (1mm) and be retained on a No. 60 (.25mm) mesh screen. Ideally a minimum of 75% of the sand should be in the medium range (.25 to .50mm) with the remainder in the course range (.50 to 1mm) with virtually all the clays and silts washed out. The color of the sand should be white or tan and the composition should be of sharp angular Quartz or Silica sand. The bunker sand shall have a minimum penetrometer reading (fried-egg test) of **2.6 Kg/cm²** tested and approved by the soil testing laboratory. Bunker sand shall also be tested for Saturated Hydraulic Conductivity. Saturated Hydraulic conductivity shall be a minimum of **25"/hr** at 30cm tension. The approved sand shall be analyzed for a good combination of penetrometer reading and saturated hydraulic conductivity. Sand samples shall be submitted to the Golf Course Architect and/or the Owner for approval of color, size, shape and consistency of quality prior to commencement of installation. **Particle Size Recommendations – No more than 3% gravel, no more than 25%**

medium-fine to very fine sand fractions combined total and no more than 3% clay and silt combined. Crusting and Set up – no crusting or set up desired after saturated and dried.

The Contractor shall be certain that sand suppliers have insurance and/or be bonded to assure all materials delivered to the site for bunker construction conform to the specification(s) of the USGA approved Physical Soil Test Lab. Samples shall be submitted in ample time to receive approval or disapproval before ordering.

The Contractor (accompanied by the Owner's representative) shall test all production runs for quality control a minimum of once the first 500 tons and every 1,000 tons thereafter. All results of materials submitted shall be released to the Golf Course Architect and Owner. Samples shall be taken from the CENTER of each pile by laterally inserting a one to one and one-half (1 – 1 ½ ") PVC pipe, twenty feet (20') in length, into the pile until the pipe has reached the approximate center. Core material from the innermost part of the pile shall be placed in a container (one container per pile). Remaining core material shall be disposed of prior to taking the next sample. A minimum of four (4) samples per pile shall be taken.

Once samples have been taken, sufficient material to fill a one gallon Ziploc plastic bag shall be gathered and sealed in such a bag, then inserted into a second Ziploc plastic bag for shipment to the testing lab.

Payment for material will not be made by the Owner without proper lab test results. The Owner will reject all materials that do not meet the approved sample testing criteria. Once samples have been approved any materials received on site that fail testing shall be removed from the site and replaced with approved materials at the Contractor's expense. Any payment to the Contractor of said failed material shall be back charged to the contractor until material has been replaced.

The Contractor is responsible for any and all laboratory testing fees. The Contractor is also responsible for any shipping expenses associated with samples and testing. The Contractor's price for material installation per ton shall include testing related fees and shipping expense. The Owner will not be held responsible for the Contractor's obligation to a testing laboratory. The Owner retains the right to hold the Contractor's payment for material installation in the event that that laboratory has made inquiries regarding payments past due, the Owner reserve the right to pay the laboratory directly, and deduct this amount, plus a 10% processing fee, from the material installation bill submitted by the Contractor.

Material Installation: Subsurface Drainage

The slopes in the bottoms of the bunkers shall be graded with care. The bottoms of all bunkers shall be slightly concave so that there is a definite low point for drainage. Surface drainage must be obtained in all bunkers, unless the Golf course Architect indicated flat bottom bunkers, to eliminate casual water therein.

After the bunkers have been shaped by the Contractor and approved by the Golf Course Architect and/or Owner, underdrains shall be installed. The Contractor shall paint out the proposed herringbone drainage pattern in each bunker. This pattern must be inspected and approved by the Golf Course Architect or the Owner's representative, prior to commencing trenching.

Drain lines throughout the bunkers shall be installed according to the latest USGA Greens Section specifications representative drawings and specifications in a herringbone or semi-herringbone fashion with no lateral lines spaced more than fifteen feet (15') apart. At all sub grade discharge points interceptor drain lines shall be installed to prevent water from settling against cavity wall.

All pipe and fittings shall be new, of the best quality, and conform to the minimum standards for plastic drain pipe. Perforated and solid pipe shall be 4" smooth double-walled ADS "N-12", Hancor co-extruded smoothwall or approved equal.

Excavation and backfilling shall be performed in a manner and sequence that will provide drainage at all times. During excavation, materials suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading. Overdepths shall be backfilled with previously excavated material or with materials specified for backfilling. Subgrade of trench shall then be uniformly firmed and compacted to minimum 85% proctor density.

Trenches for drain lines shall be excavated to a width equal to twice the outside diameter of the pipe and to a depth as is required to permit the pipe to be laid to the desired grade. No lips shall be left on trenches which would prevent surface water movement into the ditches.

All trenches shall contain a minimum of one percent (1%) slope, shall be free of any debris, and shall be cleaned of loose materials and tamped to a smooth surface. Trenches shall be inspected by Owner's representative before stone and pipe are placed in trenches. There shall be no objects located within trenches which would impede the natural flow of water.

The spoils from trenches shall be removed from the bunker and disposed of in an orderly manner approved by the Golf Course Architect and/or Owner. Areas between herringbone trenches shall be raked smooth, by hand, after the spoils are removed prior to placement of the bunker sand. All spoils shall be removed from the shell of the bunker.

The Contractor shall be very careful to prevent excess subsoil excavation from falling into the open trench before backfilling, or from being mixed with stone backfill material during backfilling. All trench spills shall be removed from the green shell.

The four inch (4") perforated plastic drain pipe shall be laid in a trench a minimum of

twelve inches (12") wide and minimum of twelve inches (12") deep. Two inches (2") of approved aggregate shall be placed in the bottom of the trenches. The plastic drain pipe shall then be placed in the center of the trench with perforations laying on the underside of pipe and shall be bedded firmly on the bottom course of aggregate. All fittings for perforated pipe shall be duck taped tightly to the pipe. No fabric will be permitted. A #14 wire shall be placed in the trench with each main drain line, as well as with discharge lines and clean out lines, for ease of location. After pipe installation, the trench shall be backfilled with **31A Crushed Gravel** and crowned slightly above surge to prevent silt from entering drain lines.

In accomplishing the work of laying the drain pipe care shall be taken to schedule the operations so that the ditches can be cut, pipe installed and backfilled during the same working day. No ditches or partially covered pipe lines shall remain open to possible rainfall. All work shall be done in a neat and orderly manner. Trenches shall be covered with an approved filter fabric and/or crown the gravel backfill two – three inches (2"-3") above top of trench line to protect the gravel from sediment washing into trenches. Fabric and/or excess gravel shall be removed prior to installation of bunker sand.

The upper ends of all main drain pipe shall be equipped with a tee joint or elbow to the surface grade. These joints shall be capped at their openings at the time of installation. This arrangement will enable the drain line to be flushed in the event of its becoming clogged. Note: All bunker drainage will be flushed and checked by the Contractor and the Owner prior to the release of retainage. All flush-outs shall be covered with an Ametek, or equal, six inch (6") Round Valve Box.

All discharge four inch (4") pipe beyond the bunker cavity wall shall connect to catch basins or lakes and shall be solid with a minimum of eighteen inches (18") of cover. Maximum depth shall be according to the pipe manufacturer's specifications. Discharge lines shall be laid directly on the clean, formed and properly sloped ditch bottom. Backfill for these lines shall be material excavated from the trenches.

All trenches that settle lower than the surrounding grade within one (1) year after installation shall be brought to the surrounding grade by the Contractor with the same type of backfill used previously and shall be sodded or planted in accordance with the specifications for the sodding or planting and be subject to the approval of the Golf Course Architect and at no expense to the Owner.

As-Builts

The Contractor shall provide the Owner accurate drawings scaled (1"=30') of all installed drain lines on each bunker. Locations shall be accurate with reference to existing site features and drainage drawings.

Material Installation: Bunker Sand

Bunker sand installation shall include the purchasing of sand, testing of sand, payment for sand testing related costs, handling and hauling of sand to each bunker, spreading and compacting sand in each bunker, raking of each bunker, and cleanup to any area damaged during installation.

Care should be taken during sand hauling to bunkers to ensure no damage to the property. Hauling routes must be approved by the Owner's representative prior to commencing. Any damage to the site, materials, finished grades, etc., as a result of the sand hauling or installation, shall be the sole responsibility of the Contractor.

After sand has been hauled to and dumped into the bunker, it may be distributed by a small bulldozer, a small tractor with a rear mounted blade, mechanical sand rakes with front mounted blades or other approved method. The Contractor must obtain the Owner's Representative approval before machinery other than mechanical bunker rakes will be approved for distribution of the sand. Spreading sand to the bunker perimeters and up on the faces shall be done by hand using rakes and shovels.

Formal bunker sand shall be placed in the bunker and compacted to a very firm, packed condition to a depth of five inches (5") on bunker bottoms. Areas of the bunker where sand shall be flashed shall have sand placed and compacted to a depth of two inches (2"). Waste bunker sand shall be placed in the bunker and compacted to a three inch (3") depth. The bunker sand shall be compacted to a minimum 85% proctor density test after placement within the bunker. The contractor shall provide a person to hand-water the bunker sand while it is being spread to help achieve the desired compaction. *A small vibratory compactor may be necessary to achieve the desired compaction. Sand shall not be spread until turf on slopes and faces have been firmly established.*

The final depth of the sand must be approved by the Owner and/or Golf Course Architect. If the sand depth is over the recommended depths, the Contractor will be required to remove the sand to the proper depth at no cost to the Owner. If the sand is under the recommended depth, more sand must be added to ensure compliance to the specification.

The sodded lip of the bunker shall not be covered with any sand. This lip or edge of the bunker must be totally visible at the time of inspection of sand depths. The lip or sod edge shall remain exposed after final raking of the bunker.

Appendix A

Sand and Gravel Bridging Criteria

Performance Factors	Recommendation
Bridging Factor	$D_{15}(\text{gravel}) \leq 5 \times D_{85}(\text{bunker sand})$
Permeability Factor	$D_{15}(\text{gravel}) \geq 5 \times D_{15}(\text{bunker sand})$
Uniformity Factors	$D_{90}(\text{gravel}) / D_{15}(\text{gravel}) \leq 2.5$
	No particles greater than 12mm
	Not more than 10% less than 2mm
	Not more than 5% less than 1mm

END of Section I

SECTION J – CLEANUP AND FINISH GRADING

Scope

The work includes, but is not limited to, furnishing all materials, labor, and equipment for the preparation of topsoil, cleanup and finish grading of all disturbed areas so as to produce a proper planting bed for sprigs, seed and/or sod. Also included in this section is finish grading to counter sink sod at greens collars, bunkers, catch basins and other features, and also cleaning out and edging bunkers. This section shall be completed according to the applicable drawings and subject to the terms and conditions of the contract.

General

Cleanup and finish grading is intended to be the final preparation of all disturbed areas for the planting operation. This line item includes any and all work not previously specified that is necessary to ensure a smooth, debris free, well drained, even surface on which to play the game of golf.

Clean up and finish grading shall begin only after:

1. The rough shaping, fairway drainage and irrigation have been completed by the Contractor and have been approved by the Golf Course Architect and/or Owner
AND
2. After the Contractor has been directed by the Golf Course Architect and Owner's representative to commence clean up and finish grading in reasonable time before scheduled grassing operations are to commence.

The Contractor shall include all work necessary to complete stone picking, removal of clearing debris that is still present, dirt clod removal and removal of wind blown debris of any form. All garbage, material scraps, stockpiles, gravel, rocks, or any unwanted litter or foreign matter shall be removed from the golf hole, and disposed of in accordance with all state, federal and local laws. This line item is all encompassing and is intended to ensure no construction debris is to be found on the golf course property. This will include removal of minor cart path construction spoil piles, and any other related construction debris or materials present on a golf hole.

Construction sequence for cleanup and finish grading will be determined by the Contractor, Owner, and/or the Golf Course Architect.

All areas to be planted shall be checked by the Contractor for positive, continuous surface drainage. The Contractor shall demonstrate to the Golf Course Architect and/or the Owner that all grades have been checked and that no areas under three percent grade (3%), "bird baths" or puddles exist.

In the areas to be grassed, care should be taken not to damage any trees, tree roots or vegetation designated to remain; and or newly planted golf course or landscape beds. If the Contractor damages any trees designated to remain, or newly planted trees or landscape beds, the Owner may hire an arborist certified by the American Arborist Association to make an evaluation and/or an appraisal of the damage to the tree. The Contractor will be responsible for all costs associated with hiring the consultant and for the assessed damage value of the tree.

Cleanup

All disturbed areas excluding tees, greens and bunkers shall be plowed to a minimum depth of four inches (4") in at least two different directions, disked and dragged with a spike tooth harrow, Scotch chain drag and land leveler until all pockets and depressions and all sharp ridges and undulations have been removed. These areas shall be machine or hand worked as necessary to eliminate all lumps, soil clods, weeds and forage grasses to achieve a smooth harmonious grade. Tillage shall include the removal of all equipment ruts and tracks, areas of compaction or erosion, and any other undesirable soil conditions which would prevent the formation of a finely pulverized seedbed.

The Contractor should exercise careful judgment to limit the leveling operation when the soil is excessively dry and dusty to avoid depressions caused by water compaction of "fluffy" soils. Tillage shall be accomplished only under proper soil conditions. The Golf Course Architect may, at his discretion, request the cessation of tillage operation during periods of severe drought, excessive soil moisture, or other unsatisfactory soil conditions. All haul roads will be properly repaired and prepared as above.

All rocks, stones, sticks, brush, roots, and other objectionable materials one-half of an inch (1/2") in diameter or more shall be removed from the top four inches (4") of planting bed soil. The tools acceptable for this cleaning process are a Harley Wind Rower and Rock Picker, Rock Hound or other tools or machines designed for the purpose. The finished planting bed preparation is subject to the approval of the Golf Course Architect and/or Owner. All such materials shall be disposed of by burying or dumping in areas approved by the Golf Course Architect and/or Owner.

Finish Grading

Areas to be planted shall be graded and floated to provide complete surface drainage. All water holding depressions and pockets shall be eliminated. Undulations and unsightly variations in grade which will not permit the use of normal mowing equipment without scalping or missing shall be removed so that proper use of mowing equipment can be performed.

Areas to be planted shall also be finished graded to meet any walks, paths or other adjoining surfaces so that, after compaction, no water pockets or ridges remain.

Areas where sod will interface with other modes of planting at greens collars, bunkers, catch basins and other features shall be finish shaped so as to counter sink the sod one inch (1") to one and a half to two inches (1 ½" – 2") such that once sod is placed, it shall be at grade with adjacent planting bed.

Finish Grading – Greens

The Contractor is responsible for providing finish grading and seedbed preparation of all putting surfaces and collars. This includes, but is not limited to, preparing a smooth, debris free, surface with positive drainage.

After the fumigation and the greens mixture has been allowed to settle, the Contractor shall fine grade the putting surface to the grades previously approved by the Golf Course Architect. The Contractor shall exercise extreme caution in this operation so as not to bring unsterilized soil or foreign matter into the greensmix.

All ridges and surfaces shall be made smooth and all surfaces then "floated out" with a grading type tractor, followed by a Sand-Pro, or equal, with drag mat. The final surfaces shall be free from all water-holding depressions or pockets. The collar of the green outside the greens-mix shall be excavated one to two inches (1"-2") lower than finished grade of putting surface to allow for positive surface flow of the putting surface such that once sod is placed, it shall be at grade with adjacent planting bed. This will give the greensmix a raised edge appearance. Collar excavation shall extend out three feet (3') minimum and far enough to allow for positive drainage. The depth of excavation shall be adjusted, as necessary, to allow for the thickness of the sod and to allow positive drainage at a minimum of three percent (3%).

Finish grading the finish surface of greens shall include wetting the USGA mix by hand to saturation, and grading and floating operations with tractor and Sand – Pro with the aid of laborer hand probing the sand to twelve inch depth (12" +/- ½") with the aid of a 12" hand probe every three feet at minimum.

Once the surface has been graded and probed, the Contractor shall survey and record the green by method of a ten foot grid set along the axis of the line of play, using the same center point and axis as used in the subgrade grid. The subgrade grid, along with artistic and strategic interest, will be the basis for approval of the finish surface by the Golf Course Architect and the Owner prior to grassing of greens. The Golf Course Architect, and/or Owner reserves the right to request modification to putting green finish surfaces and surrounds with no additional compensation to the Contractor, in order to insure adequate pinnable areas, and aesthetic and strategic interest.

Finish Grading – Sand Bunkers

The sand bunkers shall be final adjusted to the sizes and shapes as staked or painted in the field by the Golf Course Architect and/or Owner. The Golf Course Architect

reserves the right to alter the construction of any sand bunker when, in his opinion, the character of the bunker has not met the design intent. Such alteration shall not entitle the Contractor to extra compensation.

All bunker edges will be painted out by the Golf Course Architect. The Contractor will supply all paint guns and paint. The entire perimeter of each bunker shall be undercut to a depth of four inches (4") along the proposed lip and two inches (2") where sand shall be flashed to accommodate the proper depth of sand prior to sod installation.

The Contractor shall be careful to preserve the natural looking broken lines on the bunkers as directed by the Golf Course Architect and Owner's representative. The artistic and aesthetic shaping of mounds, capes, bays and outlines of all sand bunkers shall be a prerogative of the Golf Course Architect. This edging may be done by hand or a Gradeall type of equipment as agreed to by the Contractor and Golf Course Architect and the Owner's representative.

Hand contouring will be a major portion of the bunker cleanup and fine grading. The Contractor shall have a crew with shovels, rakes, pick axes and wheelbarrows to complete this work. The Golf Course Architect will review this work verbally with the Contractor. This crew shall be dedicated to the detail hand contouring of the bunkers.

Finish Grading – Tees

The finish surface of tees shall be laser leveled in a flat plane by approved laser and tractor mounted laser controlled grade box.

The perimeter of the tee surface (where sod is to interface) shall be excavated 1 ½" – 2" inches lower than finished grade of tee surface to allow for positive surface flow, and upon sod installation shall be at grade with the adjacent planting bed. The depth shall be modified as necessary to allow for the sod depth and to allow for positive drainage off the tee surface.

The Golf Course Architect and/or Owner shall approve the finished grade prior to planting of the tee surfaces.

Finish Grading – Catch Basins

A minimum of ten feet (10') around all catch basins must have a minimum of 3.0% positive surface drainage to prevent wet areas around catch basins.

All erosion control devices shall be removed from the catch basins. These devices may not be removed earlier than two (2) days prior to grassing. All excess and contaminated gravel surrounding catch basins shall be removed and replaced with clean gravel to a depth of 1 ½" -2" lower than finished grade.

The riser shall be lowered to finished grade and grates shall be placed on all catch

basins, with zero tolerance to grade elevations below 4.5 feet above sea level. All areas surrounding catch basins to be planted with sod shall be lowered 1 ½" – 2" to allow for positive surface drainage where sod interfaces with adjacent planted areas. The depth shall be adjusted, as necessary, to allow for the sod depth and to allow for positive drainage.

END of Section J

SECTION K – GRASSING

Scope

The work covered by this section includes, but is not limited to, furnishing all material, labor and equipment for the planting of sod and/or sprigs for all designated turf areas.

The base bid shall be a complete regrassing of the entire golf course. An alternate deduct has been included in the Itemized Bid Form for just regrassing the disturbed areas (defined on the drawings as the 'grading limits of disturbance'). In this event, the isolated drainage areas shall be lifting and replacement of the existing sod. Larger areas of disturbance (Holes 1, 10, 11, 15 and all green complexes) will be a combination of new sod and sprigs.

General

Prior to pH adjustment, fertilization and planting, all areas shall be inspected by the Contractor and the Golf Course Architect to assure that the planting bed has been properly prepared. The Contractor and the Golf Course Architect and/or Owner must be in agreement on the acceptability of the planting bed. Inadequate preparation of the planting bed shall result in the Contractor's reworking of the area to the complete satisfaction of the Golf course Architect and/or Owner according to the Clean-up and Finish grading specifications.

The golf course will be planted in the proper sequence, as determined by the Owner, the Contractor and the Golf Course Architect. The irrigation system must be tested and operative prior to any planting.

If construction of the golf course proper and the irrigation system are completed before the specified planting date, the contractor shall maintain all specified areas in a condition of readiness for planting by continuously disking, harrowing and dragging or by approved chemical weed control to prevent the growth of weeds that would hinder or prevent an effective planting at the specified planting time. Chemical weed control may only be applied if there is no negative response to any planting.

Irrigation water source will be tested by the Owner prior to installation of the pumping station. The water will be tested for pH, soluble salts, and saline. Amendments will be added to the soil to adjust soil pH and/or pumping station to adjust the water pH.

Materials – Soil Amendments & Fertilier

All fertilization and preplant will be done in-house by the golf course maintenance crew.

Sodding

All Bimini sod is to be supplied by G to Z Service Inc.

Sod shall consist of live, growing plants secured from sources where the soil is fertile and shall have healthy, virile root system or dense, thickly matted roots throughout the soil of the sod for a minimum of one inch. Sod shall be free from noxious weeds or other grasses and shall not contain any matter deleterious to growth or which might affect its subsistence or hardiness when transplanted. Sprigs shall be certified by the State's Department of Agriculture as to the genetic purity, free from pests and diseases, delivered in a timely fashion, and consist of stems, leaves and stolons. Only sod secured from approved sources shall be used. Prior to acceptance of sod the Contractor shall provide to the Owner evidence of DNA testing to certify genetic purity.

The Contractor shall not use sod from areas where the roots have dried because of exposure to air and sun, nor from where grass has thinned from these or other reasons.

All sodded areas shall be knotted neatly and firmly together, allowing no spaces, gaps, voids, or depressions within sodded areas. When laid on surfaces of slopes which may cause sod to slide due to the height and slope of the surface or due to the nature of the soil, sod shall be stabilized by a method acceptable to the Owner to ensure proper binding and to prevent slippage. Anchoring shall be achieved by using wooden pegs to anchor the sod to the slope. To avoid interference with the future mowing operations, pegs shall be driven beneath the mower cutting height.

Curvilinear shapes and forms shall be cut and trimmed with a sharp cutting tool to assure proper shapes and forms.

Any sod permitted to dry out or rot may be rejected and sent back at no expense to the owner if, in the judgment of the Golf Course Architect or Owners Representative, its survival after placement is doubtful.

Sprig Standards

All TifEagle green sprigs are to be supplied by Pike Creek. All Bimini sprigs are to be supplied by G to Z Service Inc.

The method of sprig measurement will be the United States Standard Bushel which is equivalent to 1.244 cubic feet.

Sprigs shall be certified by state's department of agriculture as to the genetic purity, free from pests and disease, delivered in a timely fashion and consist of stems, leaves, and stolons. The sprigs will come from a nursery approved by the Golf Course Architect or Owner's representative. After being harvested, the sprigs will be delivered to the planting site within 24 hours.

A successful planting shall be defined as the insertions of twelve (12) live sprigs per

square foot on average.

Material Specification - Warm Season Grassing

<u>Area</u>	<u>Grass Type/s</u>	<u>Application</u>
<u>Greens:</u>	TifEagle Grass Sprigs from Pike Creek	Thirty (30) bushels per 1,000SF
<u>Tees:</u>	Bimini Bermuda Grass Sprigs from G to Z Turf Services	Twenty (20) bushels per 1,000SF
<u>Fairways:</u>	Bimini Bermuda Grass Sprigs from G to Z Turf Services	Eight hundred (800) bushels per acre
<u>Near Roughs:</u>	Bimini Bermuda Grass Sprigs from G to Z Turf Services	Eight hundred (800) bushels per acre
<u>Sod:</u>	Bimini Bermuda Grass from G to Z Turf Services	

Installation

The final planting bed must be smooth and firm in order for the sprigs to be planted therein. The final surfaces must be free from water-holding depressions or pockets. All fertilizers shall be applied to the surface only no more than 48 hours prior to seeding.

The Contractor, before planting, shall inspect each area to make sure the planting bed has been properly prepared. The Golf Course Superintendent and the Golf Course Architect must be in agreement on the acceptability of the planting bed.

Greens shall be sprigged by hand of the rates and types listed in the Material Specification Chart. Sprigs shall be distributed uniformly over the designated area. **Sprigging shall not be done when the wind velocity exceeds 5 mph. The Contractor shall be prepared to have 3-4 greens sprigged per day.**

Green surfaces to be sprigged shall include the putting surface as outlined on the golf course green details. Areas outside the putting surface shall be considered shoulders and sloped and may be planted as fairways or rough.

When an automatic planting machine is used for fairways and near roughs, the machine shall insert live sprigs at 1 ½ to 2 inch centers and roll the surface smooth in one pass.

Immediately after sprigging, the area shall be protected against traffic or other use by erecting barricades, as needed, and placing approved warning signs at appropriate intervals.

Post Planting Responsibilities

All other areas disturbed during planting procedures including haul roads, equipment staging, access points or other disturbed areas, shall be repaired by the Contractor. They shall be re-graded to the original grade, fertilized and grassed in accordance with fairway or rough specifications as the situation warrants.

Immediately after completion of planting of any specific area the Contractor shall notify the Owner to commence a regular germination watering program. It will be the Owner's responsibility to maintain the required watering program following the initial watering by the Contractor. The Owner will be responsible for all hand watering of sod, as it is being laid, before it is officially turned over to the Owner.

After initial watering, the planted surface shall be watered as frequently as necessary to keep the soil surface sufficiently moist to ensure maximum germination and growth. The Contractor shall coordinate and assist in establishing proper watering procedures, quantities of application of water, time periods or watering, and any other pertinent factors to provide the finest possible growth of grass without, however, assuming any direct responsibility for germination of grass.

END of Section K

SECTION L – COMPLETION OF CONTRACT – PUNCH LIST

Completion of Work

Typically, the Golf Course Architect and/or the Owner will help prepare a punch list that indicates any and all remaining items to be completed by the Contractor. Once this list has been agreed upon by the Contractor, work will begin to complete the list. Once the punch list work items have been completed, the Owner's representative and/or the Golf Course Architect will review the items and either accept or reject them. Rejected items shall be then reworked by the Contractor to the satisfaction of the Owner.

Release of Contractor

Once the punch list work has been completed by the Contractor to the satisfaction of the Owner, the punch list shall be signed and dated by all parties. Copies of the signed list shall be distributed to all parties.

If certain items on the list cannot be completed due to weather, course opening, schedule, etc., then those items will be discussed and a reasonable solution will be negotiated by either one of two options:

- A. Reimbursement to the Owner for actual cost value to complete the work by another means.
OR
- B. The Contractor to reschedule work to be completed at a time approved by the Owner.

If no agreement can be reached regarding the punch list, then the Owner reserves the right to hold retainage until the Contractor fulfills the obligation. If the Contractor fails to complete the list within thirty (30) days of substantial completion, the Contractor may forfeit his right to such withheld retainage. Substantial completion for each hole is defined as the point which the entire hole has been grassed and turned over to the Owner for the initial watering and the start of grow in.

Retainage amount withheld shall be equal to the cost to complete the remaining work items by another means. This shall be in a manner and method as determined by the Owner, since the Contractor has failed to fulfill the original obligation.

If the punch list has been satisfactorily completed, approved and signed by the Owner and the Contractor, then the contract is considered to be satisfied, with the exception of any and all applicable warranties.

The warranty period is defined as one year, parts and labor, for all contract items, from the date of substantial completion. The contractor is responsible for timely completion of all warranty work.

Retainage will be withheld until the Owner is in receipt and accepts all as-builts to be furnished by the Contractor.

END of Section L

SECTION M – CONCLUSION OF THE SPECIFICATIONS

General

It has been our purpose in preparing these specifications to supplement the plans and provide clarification which is complete in every detail.

The overall construction, as described in the specifications is only approximate and may be changed at the time of construction in order to facilitate site conditions.

It has not been our purpose in preparing these specifications to make omissions and/or errors. Such omissions and/or errors, in either plans or the specifications shall be corrected when called to our attention. Discrepancies of any sort shall not be taken advantage of, as harmony shall be preserved at all times so that construction can be pursued efficiently and rapidly in the letter and spirit of these specifications. The true intent and meaning of the same is that all work of every kind that may be necessary for completely finishing the work, rectifying failures, and delivering a complete job, be accomplished. This is implied, although the same may not be specifically expressed.

END of Section M