Company Name - _____

REQUEST FOR RESPONSE

BID #5517
Keney Golf Course Renovation
KENEY PARK,
Hartford & Windsor, Connecticut
DPW14-20

City of Hartford
Procurement Services Unit
550 Main Street
Hartford, CT 06103

DEADLINE: 2:00 PM, TUESDAY, April 1, 2014

Susan Sheppard
Procurement Specialist
860-757-9616
smsheppard@hartford.gov

INVITATION TO RESPOND

Dear Sir/Madam:

The City of Hartford (the City) invites responses for:

RFR #: 5517	**SOLICITATION DATE: March 11, 2014**
SOLICITATION TITLE: Keney Golf Course Renovation, Keney Park	
SOLICITATION DESCRIPTION: **Repair, restoration, and renovation of an 18-hole golf course and practice facility. The work includes but is not limited to; short term maintenance of the existing golf course and undisturbed areas, reconstruction of golf course features (greens, tees, bunkers), construction of a practice range, grow-in maintenance and establishment of the golf course features, improvements to course infrastructure (drainage, cart path, bridges), installation of a new irrigation and pumping system, and installation of landscape plant material.** **Prime golf course contractor must have at least 10 years of experience in executing golf course renovation, restoration, and new construction projects. Golf course renovation, restoration, and construction must be prime contractor's primary business. Contractor must have completed at least 5 golf renovation and/or restoration projects of a similar scale and scope in the last 10 years. Contractor must be a current GCBAA – Certified Golf Course Builder.**	
SITE LOCATION (if applicable): Keney Park, Hartford & Windsor, CT	
RESPONSE DATE : April 1, 2014	**RESPONSE TIME: 2:00 p.m.**
DEPT. ASSIGNED CONTRACT #: DPW14-20	**EST. COST OF CONSTRUCTION: $2,500,000.**

A PRE-BID / RESPONSE CONFERENCE HAS BEEN SCHEDULED FOR 2:00PM on Friday, 3/14/14 at the Club House at Keney Golf Course.

This pre-bid conference is:
- ☐ **Not Applicable**
- ☒ **Mandatory** (All prospective bidders are REQUIRED to attend to discuss specifications)
- ☐ **Non-mandatory** (All prospective bidders are encouraged to attend to discuss specifications)

This solicitation contains the following sections:
Invitation to Respond
Standard Instructions
Project Site Location – *(for construction projects only)*
Table of Contents – *(for construction projects only)*

Section 1 – Response Forms

1.1 Response Information & Signature Form

Contract Compliance

- ☒ Affirmative Action / Equal Employment Opportunity Requirements – See Section 3.6
- ☒ Surety Bond Requirements ☒ Bid Bond ☒ Performance & Payment Bonds
- ☒ Insurance Requirements – see exhibits below
- ☐ Set Aside – Ord. Section 2-660 ☐ MWBE ☐ Small Contractor
- ☒ City-Based Small Business Bid Preference – Ord. Section 2-661
- ☒ 15% Minority Utilization (City of Hartford Certified MWBE) – Ord. Section 2-682
- ☐ State of Connecticut DAS Prequalification (Public Construction Project > $500,000)
- ☒ OSHA Compliance (Public Works Project > $100,000)
- ☒ Wage Requirements – Complete & attach Wage Certification Form
- ☒ Contractor Pre-Qualifications – Complete & attach Contractor Pre-Qualifications Form

1.2 Response Pricing

1.3 Statement of Qualifications

1.4 Subcontractor Information

Section 2 – Specifications/Scope of Services

☒Special Instructions / Conditions included

Section 3 – General Information for Preparation and Delivery of a Response

Section 4 – Terms and Conditions / Labor Compliance

Exhibits

☒Plans & Drawings included

Sincerely,

Susan Sheppard, Project Manager
(860) 7579616
smsheppard@hartford.gov

STANDARD INSTRUCTIONS:

- **Questions & Addenda**
  - Questions related to this project must be submitted to the PROCUREMENT Office at City Hall within seventy-two (72) hours in advance of the response submittal deadline. Responses to such questions will be posted within twenty-four (24) hours of the response submittal deadline. Respondents are responsible for obtaining all addenda related to this RFR and thus advised to check for any addenda a minimum of twenty-four (24) hours in advance of the response deadline.

- **Taxpayer's Identification Number**
  - Respondents must provide their Taxpayer Identification number on the response form (Tax ID#). Award recipients, whether an individual, proprietor, partnership or a non-profit corporation or organization must file the Internal Revenue Service Form W-9, Request for Taxpayer Identification Number and Certification with the City.

- **Responsible Candidate**
  - Respondent must not have any delinquent taxes or financial obligations due
  - Respondent must execute an affidavit to comply with all federal and state requirements
  - Respondent must be certified as an Equal Opportunity Employer
  - Respondent must have at least 10 years of experience in executing golf course renovation, restoration, and new construction projects. Golf course renovation, restoration, and construction must be prime contractor's primary business. Contractor must have completed at least 5 golf renovation and/or restoration projects of a similar scale and scope in the last 10 years. Contractor must be a current GCBAA – Certified Golf Course Builder.

- **Calendar days allowed for contract work / Substantial completion dates:**

  Golf Course SEEDING by 10/1/14.

  Complete PROJECT by 11/15/14.

- **Liquidated damages for late completion:** $1,000./calendar day

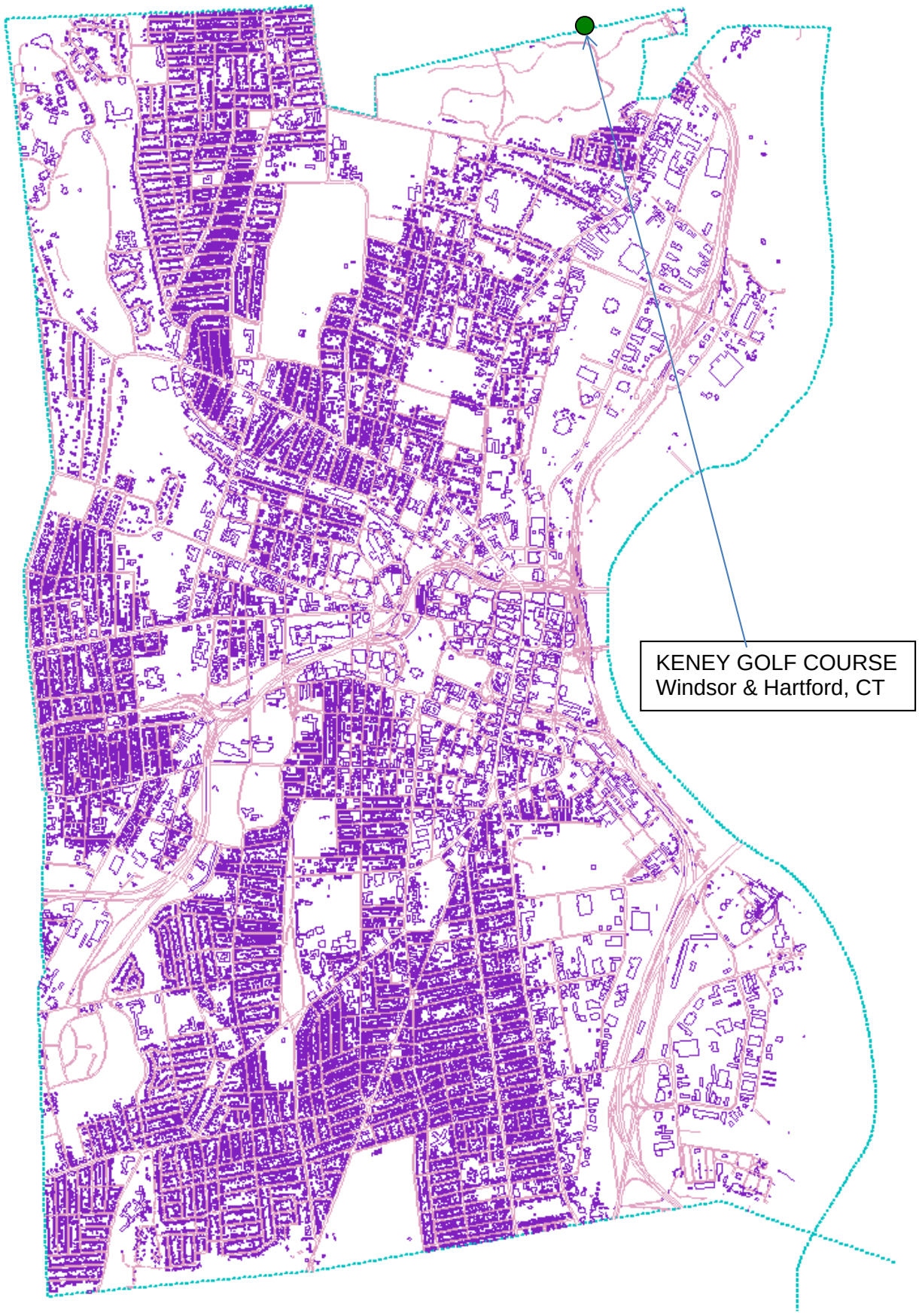
- **Bid Bond / Performance & Payment bonds *(required if checked on invitation to respond)***
  - 10% bid bond, cashiers or certified check with your response. The City of Hartford provides contractors with the option of submitting an electronic Bid Bond through the Surety2000 website. Surety 2000 is an Internet-based surety processing, verification and security system, developed in cooperation with the surety industry. You may contact Surety 2000 at 1-800-660-3263 or www.surety2000.com, for more information.
  - Performance and payment bonds for 100% of the project upon award if the contract value exceeds $50,000.00.

- **DAS prequalification program *(construction / infrastructure projects only)***
  - The DAS Contractor Prequalification Program, Connecticut General Statues Section 4a-100, requires all contractors to prequalify "before they can bid on any construction, alteration, remodeling, repair or demolition of any public building (does not apply to road construction), for work by the state or a municipality, estimated to cost more than $500,000 and which is funded in whole or in part with state funds. "

- **Drawings *(construction / infrastructure projects only)***
  - Drawings are available from Merritt Graphics' PlanWell site located at http://www.merrittgraphics.com . Click on the PlanWell link, select "Public Plan Room" and select this project. You can also contact Merritt Graphics at 800-344-4477. Fees to purchase sets are non-refundable.

Updated 8/10/12

- **Please respond with five (5) hard-copies to:** 5 copies
    - Hartford City Hall, Procurement Services, 550 Main Street, Room 100, Hartford, CT 06103



Invitation To Respond

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RFR NUMBER:	BIDNO: 5517
CONTRACT NUMBER	DPW14-20
BID TITLE :	Keney Golf Course Renovation

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RESPONSE FORMS

TECHNICAL SPECIFICATIONS

SECTION	TITLE	
DIVISION 1 - GENERAL REQUIREMENTS		
01100	SUMMARY OF WORK	03/11/2014
01210	ALLOWANCES	03/11/2014
01230	ALTERNATES	03/11/2014
01310	PROJECT MANAGEMENT AND COORDINATION	03/11/2014
01320	CONSTRUCTION PROGRESS DOCUMENTATION	03/11/2014
01400	QUALITY REQUIREMENTS	03/11/2014
01500	TEMPORARY FACILITIES AND CONTROLS	03/11/2014
01700	EXECUTION REQUIREMENTS	03/11/2014
DIVISION 2 - SITE CONSTRUCTION		
02230	SITE CLEARING	03/11/2014
02300	EARTHWORK	03/11/2014
02311	SHAPING	03/11/2014
02312	GREENS	03/11/2014
02313	TEES	03/11/2014
02314	BUNKERS	03/11/2014
02630	GOLF COURSE DRAINAGE	03/11/2014
02751	CART PATHS	03/11/2014
02810	IRRIGATION	02/28/2014
02851	TIMBER BRIDGES	03/11/2014
02852	DRY-LAID STONE WALL S	03/11/2014
02920	GRASSES	03/11/2014
02930	LANDSCAPING	03/11/2014

LIST OF DRAWINGS

SHEET	TITLE
1 PAGE	TITLE SHEET – PROJECT LOCATION
2 PAGES	STAKING AND LAYOUT PLAN
1 PAGE	CLEARING PLAN
2 PAGES	GRADING PLAN
2 PAGES	CUT / FILL PLAN
3 PAGES	DRAINAGE PLAN
3 PAGES	EROSION & SEDIMENTATION CONTROL PLAN
3 PAGES	LANDSCAPE PLAN
2 PAGES	GRASSING PLAN
1 PAGE	PHASING PLAN
1 PAGE	BRIDGE PLAN
1 PAGE	FEATURE CONSTRUCTION DETAILS
2 PAGES	IRRIGATION (HYDRAULIC & ELECTRICAL LAYOUTS)

MISCELLANEOUS

PROJECT SCHEDULE	03/11/2014
MAINTENANCE PROGRAM & SCHEDULE	03/11/2014
GROW-IN PROGRAM & SCHEDULE	03/11/2014
CITY OF HARTFORD TREE ORDINANCE	03/11/2014

GENERAL INFORMATION FOR PREPARATION OF A RESPONSE

Revision 050809

3.1	How To Respond:	
3.2	Correction or Withdrawal of Bids; Cancellation of Awards	
3.3	Quantities and/or Usages	
3.4	Questions and Addenda	
3.5	Criteria for Award	
3.6	Qualifications of Candidates Offering a Response	
3.7	The Request for Response (RFR) Process	
3.8	Contracting	
3.9	Contract Documents	
3.10	Obligations of the Candidate	
3.11	Required Forms	
3.12	Site Inspection	
3.13	Prevailing Wages	
3.14	Retainage	
3.15	Acceptable Brands	

3.16	Samples	
3.17	Response Development	
3.18	Registering with the Secretary of State	
3.19	Time Provisions	
3.20	Performance Bond and Labor & Material Bond	
3.21	Insurance	
3.22	Performance Evaluation	
3.23	Subcontractors	
3.24	Minority Business Utilization (MBE)	
3.24.1	City Certification Required	
3.24.2	Percentage of Work to be Performed	
3.24.3	Minority Business Listing	
3.24.4	Proof of Minority Business Utilization Required	
3.24.5	Changes in Subcontractors After Award	
3.25	Equal Employment Opportunity/Affirmative Action Requirements	
3.25.1	-General Information	
3.25.2	-General Information	
3.25.3	-General Information	
3.25.4	-General Information	
3.25.5	-General Information	
3.25.6	-General Information	
3.26	EEO/Affirmative Action Report	
3.26.1	Monthly Employment Utilization Report	

LABOR COMPLIANCE

	WAGE RATES (Both Hartford and Windsor) with Dept. of Labor attachments	55

	SAMPLE FORMS - included in this document by reference, are available at http://www.hartford.gov/purchasing/Documents.htm Document titled: Standard Construction Sample Forms:	

Section 1
RESPONSE FORMS

1.1 RESPONSE INFORMATION & SIGNATURE FORM

Vendor Name -				
Trade Name -				
Address -				
Phone # -	**Fax # -**	**Email Address -**		
Contact Person -		**Tax ID# -**		
Delivery / Service Start Date:		# Calendar days after receipt of executed contract:		
Bid Surety - 10%	For electronic bonds enter bond number, otherwise check the appropriate box	Electronic Bond #	☐ Bond (hard copy)	☐ Cashiers / Certified Check
Cost of Performance Bond included in base bid (if applicable)			$	Per thousand
EEO Certification Status (check one) See General Information for Preparing a Response paragraph 3.6.3			☐ Current & on file	☐ EEO form attached
DAS Prequalified Contractor? (non highway construction projects >$500,000) http://das.ct.gov/cr1.aspx?page=10			☐ Certificate attached	☐ Update Statement attached
Insurance Agent Name			Phone #	
Insurance Agent Address				

Vendor acknowledges receipt of all addenda issued during the bidding period (if applicable) and understands that they are a part of the bidding documents.

The undersigned hereby declares that he/she or they are thoroughly familiar with the specifications, the various sites, the City's requirements, and the objectives for each element of the project item or service and understands that in signing this proposal all right to plead any misunderstanding regarding the same is waived. The undersigned further understands and agrees that he will furnish and provide all the necessary material, machinery, implements, tools, labor, services, and other items of whatever nature, and to do and perform all the work necessary under the aforesaid conditions, to carry out the contract and to accept in full compensation therefore the amount of the contract as agreed to by the Contractor and the City.

The undersigned hereby declares that no reason or persons other than those named herein are interested in this proposal, which is made without any connection with any other person or persons making any proposal for the same work and is in all respects fair and without collusion or fraud; that no person acting for or employed by the City of Hartford is directly or indirectly interested therein, or in the supplies or works to which it relates, or will receive any part of the profit or any commission there from in any manner which is unethical or contrary to the best interest of said City of Hartford.

The undersigned additionally declares that they are not debarred or suspended, or otherwise excluded from, or ineligible for, participation in City of Hartford, State of Connecticut or federally funded projects (Executive Order 12549).

The undersigned certifies under penalty of false statement that the information provided in this response is true.

Submitted by ***(Signature)***		
Printed name and title		Date

(Authorized Agent of Company)

1.2 RESPONSE PRICING

Base or Lump Sum Bid and, if called for in the documents, Alternates and Unit Pricing

The City of Hartford is exempt from all sales and use tax; therefore bid prices shall not incorporate such taxes. Upon request by the successful respondent, a sales tax exemption certificate will be issued.

A. BASE BID / LUMP SUM and ALTERNATES

BASE BID / LUMP SUM as shown on the contract drawings & specifications **(Include the Owner's Contingency Allowance of $250,000.)**	$
Bid in words. (Include the Owner's Contingency Allowance of $250,000.)	
ADD ALTERNATE #1- SOD	**$**
ADD ALTERNATE #2- CONCRETE CART PATHS	**$**

B. UNIT PRICES

Instructions:
Please complete the attached 6-page Schedule of Prices that follows these response forms.

Excel Spread Sheet Responses:

Respondent is to type his unit bid price (or lump sum price when unit price is not applicable) in the UNIT PRICE column. The spreadsheet will automatically calculate the unit amounts and the total amount of bid. There is no need to type out the amounts in words as is required in a hand written response. The total amount that appears at the bottom of the spreadsheet is the figure that will be entered in section 1.2. At the bottom of the worksheet you will see tabs, one for the Base Bid and one for each Alternate if alternates are requested in the bid document.

Print a copy of the Excel spread sheet(s) and include it with your bid response if submitting a hard-copy. In addition, save a copy of the Excel Spreadsheet on a disk (CD or flash drive) and deliver it with your bid.

Handwritten Responses:

Respondents shall submit their prices in INK. This option is available to small businesses that are unable to complete the Excel spread sheet. Respondent is to write his unit bid price (or lump sum price when unit price is not applicable) in words in the blank spaces provided at the end of the description, write his unit bid price in figures under the UNIT PRICE column and write his total amount for the item under AMOUNT. In case of discrepancies between amounts shown in words and amount shown in figures, amounts shown in words will govern. In the event of a discrepancy between unit prices submitted and their totals, the unit price shall govern. In the event of a discrepancy between the lump sum bid and the subtotals, the subtotals shall govern. All erasures, alterations, or other physical changes should be initialed by the respondent, otherwise may be rejected by the Purchasing Agent as incomplete.

The respondent is advised that the description is only a summary. The unit price or lump sum bid shall include all of the items as specified in detail in the scope of services.

Schedule of Prices
Keney Park Golf Course
City of Hartford, Connecticut
prepared by: MED
date: March 11, 2014

Legend

ls	lump sum	**bu**	bushel
sf	square feet	**cy**	cubic yard
cf	cubic feet	**ph**	per hole
lf	linear feet	**ea**	each
ac	acres	**mo**	month
allow	allowance	**tn**	ton

Description	Units	Quantity	Unit Price	Subtotal
Summary of Bid Prices				
General Requirements / Mobilization				
Site Preparation / Protection				
Clearing				
Earthworks				
Shaping				
Stormwater Drainage				
Feature Construction				
Irrigation				
Seedbed Preparation				
Hardscape				
Grassing and Grow-In Program 2014				
Bridges				
Landscaping				
Maintenance Program 2014				
Miscellaneous - Owner's Contingency				$250,000.00
Total				
General Requirements - Mobilization				
Performance Bond	ls	1		
Construction Permits - Hartford and Windsor, CT	ls	1		
General Mobilization	ls	1		
Equipment and Personnel				
Job Site Office and Storage	ls	1		
Provide and maintain job-site trailer. Provide adequate meeting space for weekly project coordination meetings				
Golf course contractor may use existing cart barn building as storage (April to October 1, 2014)				
Provide and maintain storage containers as needed.				
Utilities	ls	1		
Install and maintain temporary power to offices as needed				
Provide and maintain toilet facilities for workers / staff				
Security / Fencing / Compound	ls	1		
Install fencing and security measures as needed.				
Provide adequate security on-site as needed.				
subtotal				
Site Preparation / Protection				
Staking and Layout				
Survey and staking of layout plan	ls	1		
Set and maintain bench marks on each hole for reference	ls	1		
Provide materials for staking, layout, and marking of golf course during construction	ls	1		
Tree Protection Fencing				

Install and maintain 4' orange barrier fencing around specimen trees as directed by Golf Course Architect (GCA)	lf	2,500		
Erosion and Sedimentation Control Plans				
Install and maintain silt fence.	lf	8,015		
Install and maintain straw wattles	lf	9,510		
Install and maintain straw bails	ea	100		
Chain Link Fence - Property Boundary				
Replace and repair chain link boundary fence east of hole 12 tees. Remove existing damaged fence. Replace fencing fabric and posts on 6' centers. Fencing is 6' in height.	lf	50		
Stream Crossing / Equipment / Materials				
Include equipment, soil protection, maintenance, and materials needed to provide temporary bridge crossings for construction equipment. Existing cart path and bridge locations can be utilized. Existing bridges will not be sufficient to handle weight of construction equipment. An alternative solution must be proposed by contractor. Impact of the watercourse is not allowed. No fill or temporary crossing of the watercourse that disturbs the streambank or watercourse.	ls	1		
subtotal				
Clearing				
Mechanical Removal of Trees / Shrubs / Vegetation				
Remove and dispose of tree, shrub, stumps and grub root matter. Areas accessible with large equipment	ac	2.20		
Selective Removal of Specimen Trees				
Clear trees, remove/grind stumps	ea	25		
Remove stumps from previous cleared trees	ea	175		
Removal of small trees, shrubs and other scrub vegetation				
Clear vegetation by hand in selective areas, most areas cannot have rootzone disruption. Clearing debris collected and disposed of off-site.	sf	40,334		
Removal of Existing Infrastructure / Demolition				
Removal / demolition of all existing cart path.	ls	1		
Demolition and removal of existing shelters	ls	1		
Demolition and removal of bridges and abutments	ls	1		
Demolition and removal of stairways on the golf course	ls	1		
Demolition and removal of other site debris encountered and generated during renovation. Includes but is not limited to; irrigation material, drainage pipe, existing refuse or dump piles on golf course, etc.	ls	1		
subtotal				
Earthworks				
Site Preparation - Strip and Remove Turfgrass				
Strip and remove turfgrass with sod-cutter as marked. Material to be hauled on-site to stockpile area. GCA to select bury pit location	ac	12		
Strip and remove turfgrass with excavator and grading bucket at 2" depth. This will occur in areas that large equipment such as dozers and larger excavators will perform larger grades changes	ac	16		
Preparation of Areas for Minor Grading				

Rotovate 4-6" topsoil layer after stripping of turfgrass in select areas. This would occur in areas that will have little or no change in grade but need to be loosened for removal of thatch layer and allow for minor grade changes to be made easily.	ac	5		
Excavation / Top Loading				
Excavation of soil and topload haul less than 1500 feet	cy	10,670		
Excavation of soil and topload haul greater than 1500 feet (The longer hauls are generally excavation from the golf course and taking this excess material to the designated area on the driving range)	cy	7,873		
Excavation and stockpile of topsoil (haul greater than 1500')	cy	2,750		
Excavation and stockpile of topsoil (less than 1500')		750		
subtotal				
Shaping				
Dozer and Excavator Work to Construct Features				
Work will be executed by a combination of small excavtor and small dozer for shaping and construction of the features.	ac	28		
subtotal				
Stormwater Drainage				
Purchase and Install Drainage Pipe				
4" solid with trace wire	lf	8,900		
6" solid with trace wire	lf	6,150		
12" solid with trace wire	lf	2,000		
4" filter drains (sand/gravel/perf. Pipe/wire)	lf	8,000		
Exfiltration Trench Construction				
Include excavation, gravel, sand, pipe, clean-up, sedimentation control and soil stabilization	ea	13		
Outfall Construction				
Include excavation, stone, clean-up and soil stabilization.	ea	11		
Drainage Basin Construction				
12" perforated stand pipe w/gravel and cast iron grate	ea	30		
subtotal				
Feature Construction				
Greens				
12" of compacted approved greensmix	sf	130,659		
4" layer of approved pea gravel	sf	130,659		
4" perforated pipe with gravel	lf	23,519		
Plastic interface at green perimeter	lf	8,106		
Locator wire at green well perimeter - 14 ga.	lf	8,106		
Tees				
Laser leveling of sub-grade	sf	128,005		
Laser leveling of finish grade	sf	128,005		
6" of compacted approved sand/soil mix	sf	128,025		
Formal Bunkers				
Clean up, prepare, and edge bunker and surrounds	sf	57,007		
4" perforated pipe with gravel	lf	5,701		
4" of compacted bunker sand	sf	57,007		
subtotal				
Irrigation				
AASI Specifications and Bid Documents Equipment List				
12" DR 11 4710 HDPE	lf	240		
10" DR 11 4710 HDPE	lf	280		
8" DR 11 4710 HDPE	lf	3400		
6" DR 11 4710 HDPE	lf	11500		
4" DR 11 4710 HDPE	lf	8500		

3" DR 11 4710 HDPE	lf	15500		
2" DR 11 4710 HDPE	lf	33000		
10" Mechanical Joint Gate Valve	ea	1		
8" Mechanical Joint Gate Valve	ea	4		
6" Mechanical Joint Gate Valve	ea	16		
4" Mechanical Joint Gate Valve	ea	11		
4" HDPE Ball Valve	ea	20		
3" HDPE Ball Valve	ea	59		
1" Air Release Valve	ea	8		
Rainbird				
1 ¼" 751 Part Circle/Full Circle VIH Sprinklers	ea	694		
Rain Bird ICSD Surge device	ea	58		
Paige 270DCSD	ea	8		
Paige 7072D #12 Maxi Cable	lf	23000		
Paige 7072D #14 Maxi Cable	lf	47000		
Grounding Equipment, Cadweld Connectors, and Ground Enhancement Material (Attach detailed takeoff)	ls	1		
Central Control System	ea	1		
Hand held Remote	ea	1		
Toro				
1" 835 Part Circle/Full Circle VIH Sprinklers	ea	694		
Toro DEC-SG-LINE	ea	58		
Paige 270DCSD	ea	8		
Paige 7350D #12 Cable	lf	23000		
Paige 7350D #14 Cable	lf	47000		
Grounding Equipment, Cadweld Connectors, and Ground Enhancement Material (Attach detailed takeoff)	ls	1		
Central Control System	ea	1		
Hand Held Remote	ea	1		
Toro and Rainbird				
Quick Coupling Valve	ea	180		
#6 Solid Bare Copper Wire	ea	25000		
Miscellaneous (Attached detailed takeoff)	ls	1		
Mobilization	ls	1		
Housing	ls	1		
Irrigation Consultant Field Services ($35,000 USD)	allow	1		
Provide equipment, fuel, and maintenance for Generator				
Generator capable of fully operating pumpstation prior to permanent power source or lack of permanent power source.	mo	2		
subtotal				
Seedbed Preparation				
Fine grade and prepare disturbed areas for seeding / sod	ac	22		
Fine grade and prepare areas for hydroseeding of native grass	ac	6		
Remove and dispose of Debris and Spoils from Stump Grinding from Tree Removal Contractors	ea	250		
Small scale repairs of disturbed areas inside of turf	ac	5		
This includes but is not limited to; haul roads, stump grinding pits, drainage installation, irrigation installation, and other damage from construction in the turfgrass areas. Does not include areas inside the "limits of disturbance".				
subtotal				
Hardscape				
Asphalt Cart Path				

Shaping, preparation of sub-grade, and install of asphalt cart path (8' width @ 4" depth)	lf	15,073		
Maintenance Path				
fine grade and compact subgrade of maintenance path. (8 foot width with 4" of compacted road base gravel)	lf	600		
Dry-Laid Stone Wall	lf	1,360		
Railroad-Tie / Timber Stairs				
48" railroad tie treads for construction of stairs on-site	ea	200		
Wooden Railings for Stairs				
Unit Allowance for construction of wooden railings along stairs on hole 12 and 13 tees	allow	1		
Concrete Practice Tee Pad				
4000 psi - fiber mesh concrete. Poured in place with wood forms (8' width @ 4" depth)	sf	1,600		
Over-excavate native soil subgrade and place 6" of compacted road base gravel	sf	1,600		
subtotal				
Bridges				
Construction of Bridges - 8 total				
Bridge A -Hole 2	ea	1		
Bridge B - Hole 3	ea	1		
Bridge C- Hole 12	ea	1		
Bridge D - Hole 13	ea	1		
Bridge E - Hole 14	ea	1		
Bridge F - Hole 15	ea	1		
Bridge G - Hole 16	ea	1		
Bridge H - Hole 17	ea	1		
Custom Carpentry Work on Railings				
Unit price allowance for custom carpentry work on the bridge rails.	allow	1		
subtotal				
Grow-In Program and Grassing				
Labor and Execution of Grow-In Tasks	ls	1		
Fertilizer Applications				
Pre-Plant Fertilizer Greens and Tees	ls	1		
Fertilizer on Greens and Tees	ls	1		
Fertilizer on Surrounds of Greens / Approaches / Tees	ls	1		
Fertilizer utilized in the Hydromulch	ls	1		
Seeding Applications				
Greens	ls	1		
Tees	ls	1		
Fairway / Approach Area	ls	1		
Surrounds of Greens / Tees / Approaches with Hydromulch	ls	1		
Native Grass Mix with Hydromulch	ls	1		
Hydromulch / Hydroseeding Purchase and Application	ls	1		
Purchase and Install Futerra Erosion Control Matting, or equal, on steep slopes and around work along the stream profile. Includes but is not limited to drainage installation disturbance, demolition of bridges, install of new bridges, and slope stabilization as needed on upland areas of the project. Installed at direction of GCA	sf	21,780		
subtotal				
Landscaping				
Canopy Trees				
Red Maple	ea	6		
Sugar Maple	ea	15		
Shagbark Hickory	ea	8		

American Beech	ea	8		
Tulip Tree	ea	7		
Black Gum	ea	11		
White Oak	ea	9		
Scarlet Oak	ea	10		
Pin Oak	ea	5		
Red Oak	ea	12		
Eastern Red Cedar	ea	15		
White Pine	ea	25		
Understory Trees				
Shadblow Serviceberry	ea	30		
River Birch	ea	6		
Ironwood	ea	9		
American Dogwood	ea	32		
Witch Hazel	ea	16		
American Hophornbeam	ea	23		
Sassafras	ea	8		
Shrubs				
Sweet Pepperbush	ea	17		
Winterberry	ea	12		
Mountain Laurel	ea	51		
Spicebush	ea	16		
Swamp Azalea	ea	10		
Highbush Blueberry	ea	22		
Sweet Viburnum	ea	14		
subtotal				
Maintenance Program				
Maintenance Program for 2014				
Hire Golf Course Superintendent. Salary equivalent to $75,000 per annum	ls	1		
Labor and Execution of Maintenance Tasks	ls	1		
Fertilizer Applications				
Fairways and Rough	ls	1		
Greens and Tees	ls	1		
Plant Protectants	ls	1		
Seeding Applications				
Inter-Seeding Fairways	ls	1		
Inter-Seeding Rough	ls	1		
Purchase and Use Green Covers	ls	1		
Snow Fence / Winter Turf Protection				
Wooden snow fence secured with temporary posts	lf	7,600		
subtotal				
Miscellaneous				
Owner's Contingency Allowance				**$250,000.00**
Pricing of Alternates - Not included in total price				
Sod - Green and Tee Surrounds / Rough High Fescue Mix				
Sod with high fescue turf ratios as described in Grow-In Program.	sf	435,600		
Concrete Cart Paths				
4000 psi - fiber mesh concrete. Poured in place with wood forms (8' width @ 4" depth)	lf	15,073		

1.3 STATEMENT OF QUALIFICATIONS

Please complete the following information. Failure to respond to all items may result in the rejection of your response.

1. Number of years in business - D-U-N-S Number:

2. Number of personnel employed Part time - , Full time - ,

3. List up to six past contracts of this type/size your firm has completed within the last three (3) years:

Project	Date	Contact Person	Phone No.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.

4. DAS CONTRACTOR PREQUALIFICATION *(required for construction / infrastructure projects only)* DAS prequalified? ☐Yes ☐No	You certify that there has been no substantial change in your financial position or corporate structure since your most recent prequalification certificate was issued or renewed, other than those changes noted in the update statement (attached).	YES ☐	NO ☐

5. ORGANIZATIONAL STRUCTURE OF BUSINESS ENTITY (select one)	☐	General partnership (GP)
	☐	Limited partnership (LP)
	☐	Limited liability corporation (LLC)
	☐	Limited liability partnership (LLP)
	☐	Corporation
	☐	Individual doing business under a trade name (sole proprietor)
	☐	other (specify)

6. CITY OF HARTFORD TAX STATUS / OTHER FINANCIAL OBLIGATIONS	**Hartford Businesses** – All City of Hartford taxes & financial obligations (real, motor & personal property) are current and paid in full or subject to a current and approved payment plan. Please attach RFR Affidavit.	Yes ☐	No ☐

	Non-Hartford Businesses - All City of Hartford financial obligations are current and paid in full or subject to a current and approved payment plan. Please attach RFR Affidavit.	Yes ☐	No ☐
7. STATUS OF THE BUSINESS AND ITS CURRENT STANDING WITH THE SECRETARY OF STATE'S OFFICE	**Connecticut businesses** - Are all required filings current with the Secretary of State and will the Secretary of State be able to issue a Certificate of Legal Existence?	Yes ☐	No ☐
	Out-of –State (foreign) businesses – Have you filed a Certificate of Authority / Application of Registration with the Connecticut Secretary of State? If so, submit a copy of your filing with your response. If not, submit a copy of your Certificate of Good Standing from your state of incorporation.	Yes ☐	No ☐

8. Is your local organization an affiliate of a Parent company? If so, Indicate the principal place of business of the parent company and the name of agent for service.					
Business Name	.				
Address	.				
City	.	State	.	Zip	.
Name of Agent	.				

9. List all Affiliated Businesses (attach additional sheets as necessary):

Business Name	**Address**	**Ownership Interest %**
.	.	.
.	.	.
.	.	.
.	.	.

10. Based on the organizational structure of your business, provide a current listing of all corporate officers, principals, general or managing partners, limited partners, managers and members. If sole proprietorship or general partnership, attach trade name certificate filed with the town clerks office.

11. Submit copies of all required business (trade & occupational) licenses with your response.

12. Your company may be asked to submit information relative to your company's financial statements and/or a Dun & Bradstreet report may be obtained prior to receiving an award. This information will be protected to the fullest extent required by law.

13. Contractor Pre-Qualifications

Prime golf course contractor must have at least 10 years of experience in executing golf course renovation, restoration, and new construction projects. Golf course renovation, restoration, and construction must be prime contractor's primary business. Contractor must provide evidence that they have successfully completed at least 5 golf renovation and/or restoration projects of a similar scale and scope to the highest industry standards, in the last 10 years. Contractor must be a current GCBAA – Certified Golf Course Builder.

Additional experience requirements for project supervisors, construction professionals, and staff are listed in construction documents.

Applicant certifies that they meet the above qualifications;

Print Name – Title _____

Signature_____ **Date** _____

1.4 SUBCONTRACTOR UTILIZATION

Forms labeled Section 1.4 are provided below to accommodate the Base Bid (or Lump Sum) and alternates (if called for) in this Request for Response (RFR).

The information provided below applies to: (Check one box as appropriate)

Base Bid	Alternate 1	Alternate 2	Alternate 3	Alternate 4	Alternate 5
☒	☐	☐	☐	☐	☐

1.4 SUBCONTRACTOR UTILIZATION

If subcontractors are to be used, indicate the firm name, address, portion or section of work the subcontractor will be performing, the subcontract value, percentage of base bid and if the subcontractor is a City certified (MWBE).

Respondent agrees to subcontract the portion of the work stipulated below to (MWBE) businesses. A copy of the contract between the respondent and the subcontractor will be required prior to execution of contract.

Note: Connecticut General Statues Section 4a-100, Prequalification now applies to subcontractors also.

Trade or Nature of Work	BUSINESS NAME AND ADDRESS	CITY OF HARTFORD CERTIFIED MWBE	% of Base Bid	Subcontract $ Value
		☐		
		☐		
		☐		
		☐		
		☐		
		TOTAL SUBCONTRACT VALUE		
		TOTAL (MWBE) SUBCONTRACT VALUE		

Subcontract % to total project ***%***

MWBE Subcontract % to total project

Additional information may be requested subsequent to your responding to this bid request.

The information provided below applies to: (Check one box as appropriate)

Base Bid	Alternate 1	Alternate 2	Alternate 3	Alternate 4	Alternate 5
☐	☒	☐	☐	☐	☐

1.4 SUBCONTRACTOR UTILIZATION

If subcontractors are to be used, indicate the firm name, address, portion or section of work the subcontractor will be performing, the subcontract value, percentage of base bid and if the subcontractor is a City certified (MWBE).

Respondent agrees to subcontract the portion of the work stipulated below to (MWBE) businesses. A copy of the contract between the respondent and the subcontractor will be required prior to execution of contract.

Note: Connecticut General Statues Section 4a-100, Prequalification now applies to subcontractors also.

Trade or Nature of Work	BUSINESS NAME AND ADDRESS	CITY OF HARTFORD CERTIFIED MWBE	% of Base Bid	Subcontract $ Value
		☐		
		☐		
		☐		
		☐		
		☐		
		TOTAL SUBCONTRACT VALUE		
		TOTAL (MWBE) SUBCONTRACT VALUE		

Subcontract % to total project ***%***

MWBE Subcontract % to total project

Additional information may be requested subsequent to your responding to this bid request.

The information provided below applies to: (Check one box as appropriate)

Base Bid	Alternate 1	Alternate 2	Alternate 3	Alternate 4	Alternate 5
☐	☐	☒	☐	☐	☐

1.4 SUBCONTRACTOR UTILIZATION

If subcontractors are to be used, indicate the firm name, address, portion or section of work the subcontractor will be performing, the subcontract value, percentage of base bid and if the subcontractor is a City certified (MWBE).

Respondent agrees to subcontract the portion of the work stipulated below to (MWBE) businesses. A copy of the contract between the respondent and the subcontractor will be required prior to execution of contract.

Note: Connecticut General Statues Section 4a-100, Prequalification now applies to subcontractors also.

Trade or Nature of Work	BUSINESS NAME AND ADDRESS	CITY OF HARTFORD CERTIFIED MWBE	% of Base Bid	Subcontract $ Value
		☐		
		☐		
		☐		
		☐		
		☐		
			TOTAL SUBCONTRACT VALUE	
			TOTAL (MWBE) SUBCONTRACT VALUE	

Subcontract % to total project ***%***

MWBE Subcontract % to total project

Additional information may be requested subsequent to your responding to this bid request.

Hartford Affirmative Action Plan / Equal Employment Opportunity Agreement & Affidavit

Each contractor, subcontractor and supplier subject to the provisions of Article XII, Section 2-680, et seq. of the Hartford Municipal Code, will execute this Agreement & Affidavit, prior to the execution of any binding agreements with the City of Hartford. This agreement shall form a part of and be deemed attached to all contracts or purchase orders between the City of Hartford (the City) or its Agent and the undersigned.

During the performance of this contract, the Contractor agrees to comply with the following:

1. Each Contractor will comply with all provisions of Executive Order No. 11246, Executive Order No. 11375 and Executive Order No. 11063, Connecticut Fair Employment Act, the Vocational Rehabilitation Act of 1973, including all standards and regulations which are promulgated by the government authorities which established such acts in said requirements, and all standards, and regulations incorporated herein by reference.

2. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, age, sex or national origin or physical or mental handicap, religion and sexual orientation. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated, during employment, without regard to their race, creed, color, age, sex, national origin or physical or mental handicap, religion and sexual orientation. Such actions shall include, but not be limited to, the following Employment, Upgrading, Promotion, Demotion, or Transfer, Recruitment or Recruitment Advertising, Layoff, or Termination; Rates of Pay or other forms of compensation; and Selection for Training, including Apprenticeship.

3. The Contractor will designate a person to handle affirmative action matters for the company who will have the responsibility for assuring compliance.

4. The Contractor will submit his company's written Affirmative Action / EEO policy statement to the City of Hartford as part of his EEO Certification.

5. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, creed, color, age, sex, national origin or physical or mental handicap, religion and sexual orientation.

6. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the compliance officer setting forth the provisions of this nondiscrimination clause.

7. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the contractor's commitments.

8. The Contractor will furnish and submit all documents, information and reports required by the City of Hartford, Executive Order No. 11246, as amended, the Vocational Rehabilitation Act of 1973, and by the rules, regulations and orders of the Secretary of Labor, pursuant thereto, and will permit access to his books, records and accounts by the Contracting Agency, the City and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders. All records must be retained for a period of 3 years following the completion of work and shall be available at reasonable times and places for inspection by authorized representative of the City.

9. The Contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order. Such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Owner may direct as a means of enforcing such provisions.

10. The Contractor will contact the business agent for the labor unions with whom he has an agreement and request minority persons be referred for work on this project.

11. Prior to awards of subcontractors or purchase orders for this work, the Contractor will conduct informal meetings with interested MBE/WBE suppliers and contractors for the scope of the work to be awarded. Copies of such contracts must be provided to the City prior to the execution of contract.

12. The Contractor shall make all good faith efforts to comply with the Affirmative Action goals of the City by consulting with the City of Hartford's Contract Compliance Manager, regarding specific affirmative steps to undertake and by maintaining documentation of all advertising and recruiting efforts.

13. The Contractor shall set aside 15% of the total project costs for certified Minority & Women Business Enterprises.

14. The Contractor assures that no less than 15% of the total project work hours, by trade, will be worked by minority trades-workers.

15. The Contractor assures that no less than 30% of the total project work hours will be worked by Hartford Residents.

16. Contractor certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control, where segregated facilities are maintained. As used in this Agreement, the terms "segregated facilities" means any waiting rooms, work areas, restrooms, and wash rooms, restaurants, and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, creed, color, age, national origin or physical or mental handicap, religion and sexual orientation because of habit, local custom otherwise.

17. The Contractor shall notify the City of Hartford of all job openings located within the Hartford Labor Market Area and shall require their subcontractors or vendors to advise the Contract Compliance Officer as to the opportunities for employment within the vendor's or subcontractor's organization, for the duration of this project.

18. In the event of the Contractor's noncompliance with the nondiscrimination and equal employment clauses of this contract, this contract may be canceled, terminated or suspended, in whole or in part, without penalty to the City or his Agent.

My organization hereby agrees to comply with all the terms noted above in the Hartford Affirmative Action Plan / Equal Employment Opportunity Agreement.

_____ _____

(signature of authorized agent) (date)

AFFIDAVIT FOR BECOMING SIGNATORY TO THE "HARTFORD AFFIRMATIVE ACTION PLAN"

I, _____, being duly sworn do depose and say:
(insert name and title of authorized agent

1. I am an official of the following organization and I am authorized to submit this affidavit for and on behalf of my organization, thereby binding it to the terms and statements contained herein.

2. My organization hereby agrees and certifies as a condition of participating on construction projects of the City of Hartford that it will not practice discrimination in regard to minority group individuals and women and will eliminate any continuing effects, if any, of past discrimination.

3. My organization hereby acknowledges its agreement with the intent; purpose and scope of the Hartford Affirmative Action Plan adopted pursuant to Section 2-680 et seq. of the Municipal Code of the City of Hartford, and will make all good faith efforts to comply with its provisions.

4. My organization hereby agrees to comply with the contractual responsibilities regarding Minority Business Utilization, Minority & Female trades-worker participation and Hartford Residency requirements of City of Hartford projects.

_____ _____
(insert name of company) (signature of authorized agent)

Subscribed to and sworn to before me this _____ day of _____, 20_____

(Check appropriate box) _____

( ) Commissioner of Superior Court

( ) Notary Public, my commission expires:

CITY OF HARTFORD
WAGE CERTIFICATION FORM

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the following wages as required for such project (a copy of the rates which is attached hereto):

☐ State of Connecticut Prevailing wage rates

☐ Federal Prevailing wage rates

☐ City of Hartford Living wage rates

_____
Signature

Subscribed and sworn to before me this _____ day of_____, 20_____

_____
Notary Public

Request for Response (RFR)
AFFIDAVIT

STATE OF CONNECTICUT)
) ss. _____, 20___
COUNTY OF _____)

I, _____, being duly sworn, depose and say:
(insert name of authorized agent)

1. I am the _____ of _____ (the
(insert title) (insert name of company)
"Respondent") and am authorized on behalf of the Proposer to make this Affidavit.

2. I am over 18 years of age and understand the obligations of an oath.

3. There are no delinquent real and personal property taxes due the City of Hartford from the Respondent.

4. The Respondent is current on all monetary obligations due the City of Hartford.

5. The Respondent is currently in compliance with all applicable laws, regulations and ordinances of the United States, State of Connecticut and the City of Hartford.

_____
(insert name of company)

By: _____
Name:
Title:

Subscribed and sworn to before me, _____, the undersigned officer this

_____ day of _____, 20___.

_____
Notary Public
My Commission Expires:

TECHNICAL SPECIFICATIONS

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following;
1. Work covered by the contract documents.
2. Contracts
3. Work Phase – Construction Schedule
4. Use of premises
5. Work restrictions
6. Work under other contracts
7. Specifications formats and conventions
8. Permit fees
9. Project Sign

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Repair, restoration, and renovation of an 18-hole golf course and construction of a practice facility at a project currently known as Keney Park Golf Course.

1. Project Location: Keney Park, Hartford & Windsor, CT - USA
2. Developer: City of Hartford, Department of Public Works.
3. Golf Course Architect: The golf course construction documentation were prepared for the Project by Dusenberry Golf Course Design LLC, 4230 N. Oakland Ave #214, Shorewood, WI 53211 – USA.
4. Landscape Architect: Richter & Cegan, 8B Canal Court, Box 567, Avon CT 06001
5. Civil Engineer: Torres Engineering, 63 Reed Drive, Wethersfield, CT 06109
6. Irrigation Designer: AASI, Mr. Paul Granger, 129 Petticoat Lane. Lebanon, NJ 08833

B. The Work generally includes;
1. Site preparation and protection
2. Site clearing and shaping/earthworks
3. Reconstruction of golf course features (greens, tees, bunkers)
4. Construction of a practice area.
5. Improvements to golf course infrastructure such as drainage, cart path, and bridges.
6. Installation of a new irrigation system and pumpstation.
7. Seedbed preparation and grassing.
8. Installation of landscape plant material.
9. Short term maintenance of the existing golf course and undisturbed areas. Grow-In establishment and maintenance of the golf course features.

The overall project is primarily repair, restoration, and renovation of an 18-hole golf course and practice facility.

1.4 CONTRACTS

A. Project will be constructed under multiple contracts. Each contract is performed concurrently and coordinated closely with construction activities performed on Project under other contracts.

1.5 WORK PHASES

A. The Work will be conducted under 1 phase in the 2014 summer season. Additional information provided in the PHASING PLAN
   1. Commencement of Work: Work to commence upon selection and mobilization of contractor.
   2. Substantial Completion of Work: See "Liquidated Damages" Section for Substantial Completion dates for Work.
      a. Golf Course Seeding: October 1, 2014
      b. Substantial Completion of Work: November 15, 2014
   3. Contractor to provide schedule of work in accordance with the scope of work proposed and the substantial completion dates (additional details in Division 1 Section "Project Management and Coordination".)

1.6 USE OF PREMISES

A. General: Each Contractor shall have full use of golf course premises for construction operations, including use of Project site, during construction period. Each Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.7 WORK RESTRICTIONS

A. On-site Work Hours: Due to accelerated schedule work will need to occur outside of normal 8 AM. – 5 PM. business hours. Work shall generally occur during extended working hours of 7:00 AM to 7 PM, Monday through Saturday, except otherwise indicated.

1.8 WORK UNDER OTHER CONTRACTS

A. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

B. Separate Contracts and Owner Performed Work: Owner will self-perform or award separate contracts for performance of certain construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract. The self-performed work or contracts include, but are not limited to, the following:
   1. Stage 1& 2 Clearing: Perform clearing of specimen individual trees on the golf course.
   2. Site Work: Perform site preparation, grading, and hardscape work associated with the maintenance compound, clubhouse surrounds, parking lots, and roads.
   3. Building Construction and Renovation: Demolition of buildings and structures at the clubhouse/maintenance campus area. Renovation of the clubhouse and associated landscape and hardscape vertical features. Construction of pumphouse, cart barn, and maintenance building.

1.9 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.10 PERMIT FEES

A. City of Hartford
1. Permit Fees are waived except for the State Education Fee of $.22/$1000 and the $25 Permit Application Fee.

B. Permit Fees are not waived for Town of Windsor. See Town of Windsor fee schedule for construction permits. Fees are responsibility of the contractor.

PART 2 - PRODUCTS

2.1 PROJECT SIGN

A. The contractor shall erect a Project Sign located so as not to require relocation during construction. Proposed location and proposed text and face of sign shall be approved by the Owner’s Representative. Contractor shall submit a Shop Drawing illustrating scaled image of sign face for approval by Owner’s Representative. Sign shall be 8 feet long by 6 feet high with the bottom of the sign mounted at 4 feet above the adjacent grade and secure to the ground with pressure treated 4 x 4 posts. Text and graphic shall include:
1. City of Hartford
2. Mayor Pedro E. Segarra
3. The City of Hartford Seal
4. Project Name
5. Owner’s Name
6. The name of the Contractor
7. The name of the Golf Course Architect
8. The name of the Landscape Architect

B. Sign material shall be exterior grade plywood.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

1. Certain materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Contingency Authorization (CA)

B. Types of allowances include the following:
1. Contingency allowances

C. Related Sections include the following:

1. Division 1 Section "Unit Prices" for procedures for using unit prices.

1.3 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Owner’s Representative for Owner’s purposes and only by the Contingency Authorizations that indicate amounts to be charged to the allowance.

B. Contractor’s overhead, profit and related costs for products and equipment ordered by Owner under the contingency allowance area included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, bond and similar costs.

C. Contingency Authorizations authorizing use of funds from the contingency allowance will include Contractor’s related costs and reasonable overhead and profit margins.

D. At Project Closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.4 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Golf Course Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Golf Course Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Golf Course Architect from the designated supplier or approved equal.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF CONTINGENCY ALLOWANCES

A. Contingency Allowance No. 1: Include $250,000.00 (two hundred fifty thousand) as an “Owner’s Contingency Allowance” for this project.

3.4 SCHEDULE OF QUANTITY ALLOWANCES

3.5 SCHEDULE OF UNIT PRICE ALLOWANCES

END OF SECTION 01210

SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Sod - Provide high percentage fescue rough grass sod. Specific varieties as indicated in Division 2 Section 02920 “Grasses” and Grow-In Program. The area of sod as indicated in the schedule of prices. This is an alternate to seeding of the disturbed areas of rough grass surrounding the greens, bunkers, and tees.

B. Alternate No. 2: Concrete Cart Path - Materials and work as indicated in Division 2 Section 02751 “Cart Paths”. The area of concrete cart path equal to asphalt cart path and listed in the schedule of prices. This is an alternate for asphalt cart path.

END OF SECTION 01230

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Summary" for a description of the division of Work among separate contracts and responsibility for coordination activities not in this Section.
2. Division 1 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
3. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.3 COORDINATION

A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with other contractor’s, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.4 SUBMITTALS

A. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

B. Qualification Data: For personnel specified in "Quality Assurance" Article to demonstrate their capabilities and experience. **Submit to Owner and Golf Course Architect with Bid Proposal. Award of the Contract cannot be made without this information submittal.** Include lists of complete projects with project names and addresses, and the contact information of the golf course architects and owner or owner’s representative.

1.5 QUALITY ASSURANCE

A. Superintendent Qualifications: An experienced construction superintendent who has completed golf courses similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Shaper: An experienced shaper who has completed golf courses similar in quality, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Project Foreman: Experienced Foreman that will supervise labor and construction crews in the execution of golf course construction activities. Provide qualification date for each foreman and their responsibilities on the Project.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1. Include special personnel required for coordination of operations with other contractors. For example, Regional Project Managers or Supervisory Managers that provide support for the

personnel on the project daily. Also provide the frequency with which this personnel will be on the Project site.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Golf Course Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees prior to the meeting.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned; including Owner, Golf Course Architect and team sub-consultants, within 2 business days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Golf Course Architect, but no later than **15 days** after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Golf Course Architect, and their consultants; Contractor and its superintendent; major subcontractors and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, include but are not limited to the following:

a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing.
d. Designation of responsible personnel.
e. Procedures for processing field decisions and Change Orders.
f. Procedures for processing Applications for Payment.
g. Distribution of the Contract Documents.
h. Submittal procedures.
i. Preparation of Record Documents.
j. Use of the premises.
k. Responsibility for temporary facilities and controls.
l. Parking availability.
m. Office, work, and storage areas.
n. Equipment deliveries and priorities.
o. First aid.
p. Security.
q. Progress cleaning.
r. Working hours.

C. Progress Meetings: Conduct progress meetings at bi-weekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: Representatives of Owner, Golf Course Architect (in attendance or by conference call as needed), and each contractor, subcontractor, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these

meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site utilization.
        8) Temporary facilities and controls.
        9) Work hours.
        10) Hazards and risks.
        11) Progress cleaning.
        12) Quality and work standards.
        13) Change Orders.
        14) Documentation of information for payment requests.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

    a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Daily construction reports.
4. Special reports.

B. Related Sections include the following:

1. Division 1 Section "Summary" for a description of the division of Work among separate contracts.
2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor activity is an activity that must be completed before a given activity can be started.

B. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

C. Major Area: A golf hole, pump house, or a similar significant construction element.

D. Milestone: A key or critical point in time for reference or measurement.

1.4 SUBMITTALS

A. Contractor's Construction Schedule: Submit 2 printed copies and 1 electronic copy of initial schedule to the Owner and Golf Course Architect.

B. Special Reports: Submit 2 copies and 1 electronic copy at time of unusual event to the Owner and Golf Course Architect.

1.5 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, and interim milestones.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review time required for review of submittals and resubmittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for completion and startup procedures.
9. Review and finalize list of construction activities to be included in schedule.
10. Review submittal requirements and procedures.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat golf hole or area as a separate numbered activity for each principal element of the Work.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Work under More Than One Contract: Include a separate activity for each contract.
2. Work Restrictions: Show the effect of the following items on the schedule:

a. Coordination with existing construction.
b. Provisions for future construction.
c. Seasonal variations.

3. Work Stages: Indicate important stages of construction for each major portion of the Work.

4. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to commencement of the Work, Substantial Completion, and Final Completion.

E. Resources: Include resource quantities and costs coordinated with the Schedule of Prices.

F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.2 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within 7 days of date established for commencement of the Work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for commencement of the Work. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2. Assign resources to each activity, coordinated with the Schedule of Values.

C. Value Summary: Prepare a cumulative value list, sorted by Specification Section, and coordinated with the Schedule of Values (also referred to as Schedule of Prices).

1. Tabulate activity number, description, resource(s), unit of measure, unit price, contract quantity, contract cost, actual quantity to date, actual cost to date, quantity at completion, cost at completion, variance quantity, and variance cost.

2. Tabulate the contract cost, actual cost to date, cost at completion and variance cost for project with total at bottom.

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Orders and requests of authorities having jurisdiction.
10. Change Orders received and implemented.
11. Services connected and disconnected.
12. Equipment or system tests and startups.
13. Substantial Completions authorized.

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute electronic copies of approved schedule to Golf Course Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 END OF SECTION 01320

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-control services required by Golf Course Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:

1. Divisions 2 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Golf Course Architect.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency. Testing Agency to be approved by Owner and Golf Course Architect prior to testing.

1.4 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Golf Course Architect.

1.5 SUBMITTALS

A. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

C. Insurance: Prior to commencement of any Work, provide Owner with hard copy documentation for proof on insurance. Owner determiners Contractor’s and Sub-Contractor’s minimum requirements for insurance and other requirements relating to insurance.

D. Submittal Package for All Materials Specified: Contractor to submit package that lists all materials technical information and samples. In addition, all manufacturer warranty information should be included in the submittal packet.

1. 2 copies to be submitted to the Golf Course Architect. Submittal package to be given to Golf Course Architect and approved prior to the ordering of any material. This submittal includes the irrigation as well.
    a. Golf Course Architect to keep one set for review and distribute one set to Owner.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Personnel Qualifications: Experienced personnel who have completed golf courses similar in design and extent to that indicated for this Project and whose work has resulted in construction of the highest quality.

F. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, and that specializes in types of tests and inspections to be performed. Owner and Golf Course Architect to approve Testing Agency in writing prior to execution of testing.

G. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Golf Course Architect Field Representative.
2. Notify Golf Course Architect in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Golf Course Architect's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

A. Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction.
1. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection of Work are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 1400

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

B. Temporary utilities include, but are not limited to, the following:

1. Water service.
2. Sanitary facilities, including portable toilets.
3. Electric power service.
4. Telephone service.

C. Support facilities include, but are not limited to, the following:

1. Field offices.
2. Storage and fabrication sheds.
3. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities include, but are not limited to, the following:

1. Environmental protection.
2. Stormwater control.
3. Staging area enclosure fence.
4. Security enclosure and lockup.
5. Barricades, warning signs, and lights.
6. Fire protection.

E. Related Sections include the following:

1. Division 1 Section "Execution Requirements" for progress cleaning requirements.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Golf Course Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. Owner's Representative.
2. Golf Course Architect.
3. Testing agencies.
4. Personnel of authorities having jurisdiction.

B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project site.

C. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site. This does not include water used for irrigation.

D. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site.

1.4 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.
2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials or undamaged, previously used materials in serviceable condition may be used. Provide materials suitable for use intended.

B. Portable Chain-Link Fencing: Minimum 2-inch, 9-gauge, galvanized steel, chain-link fabric fencing; minimum 6-feet tall with galvanized steel pipe posts; minimum 2.5-inch OD line posts and 3-inch mm OD corner and pull posts, with 1.5-inch OD top and bottom rails. Provide galvanized steel bases for supporting posts.
1. Contractor will be responsible for securing and maintaining a yard for storage of materials and equipment.

2.2 EQUIPMENT

A. General: Provide equipment suitable for use intended.

B. Field Offices: Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.
1. Owner is making available the Cart Barn south of the clubhouse available for use by the Contractor and its sub-contractors from April to approximately October 1, 2014. Owner reserves the right to reduce the timeframe that the Cart Barn building is available to the golf course contractor.

C. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

D. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
1. Regular maintenance required.
a. Maintenance includes moving the toilet units to area of site where workers are present.
2. Adequate quantities to handle the needs of employees working on-site.

E. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

F. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction.

B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

D. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, overload protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

E. Communication Service: Provide temporary telephone and/or high speed internet service for the field office.
   1. Access and use provided to Owner, Golf Course Architect, and sub-consultants.
   2. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when on-site.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

   1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
   2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed storage trailers.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.

C. Staging Area Enclosure Fence: Before construction operation begins, erect enclosure fence with lockable entrance gates. Enclose area sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering except by entrance gates.

D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

E. Temporary Fire Protection: Provide fire extinguishers, installed on walls on mounting brackets, for Field Offices.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of

interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor.
2. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Execution Requirements."

END OF SECTION 01500

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field surveying.
3. General installation of products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

B. Related Sections include the following:

1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

B. Existing Utilities: Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
1. Coordinate with Owner, utility companies, and the department of public works to identify all potential underground utilities in the City of Hartford and Town of Windsor, CT.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

3.3 CONSTRUCTION LAYOUT

A. Staking: Locate and lay out golf course elements and elevations, including, but not limited to; turnpoints, limits of disturbance, excavation, fill, top soil replacement, greens, tees, bunkers, subdrainage piping, stormwater piping, drains, cart paths, landscape plants, sprinklers, valves, controllers, irrigation piping, and timber bridges.
1. Golf Course Architect will supplement with field staking of features. Staking supplies provided by golf course contractor.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing property corners. Contractor will provide additional benchmarks and control points for setting elevations at each golf hole and elsewhere as needed to locate each element of the project.

B. Contractor will provide locations of golf course centerlines, tee points, turning points, green centers.

C. Owner will provide wetland limits, development property limits, and property lines for lots inside of the development.

D. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of operations.

E. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

D. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

E. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

F. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction.

B. Restore permanent facilities used during construction to their specified condition.

C. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION 01700

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Tree Protection Fencing.
2. Mechanical Clearing, grubbing and disposal.
3. Selective Removal of Specimen Trees
4. Stump Removal
5. Hand Removal.
6. Site Preparation- rotovating, sod cutting, sod stripping
7. Removal of Existing Infrastructure/Demolition

B. Related Sections include the following:
1. Division 1 Section "Unit Prices" for a schedule of unit prices.
2. Division 1 Section "Construction Facilities and Temporary Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures during site operations.
3. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.
4. Division 2 Section "Shaping" for topsoil replacement.

1.3 ALLOWANCES

A. N/A

1.4 UNIT PRICES

A. List of Unit Prices: A list of unit prices is included at the end of this Section.
1. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.
a. Also refer to the attachments to the bid package:
1) Schedule of Prices
2) Maintenance Program & Schedule
3) Grow-In Program & Schedule
4) Golf Course Irrigation Plans and Specifications

B. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Tree Protection Fencing: Includes preparation, installation and maintenance.

2. Clearing - Mechanical: Includes preparation, protection of trees and vegetation, and disposal.
3. Clearing – Selective Removal of Specimen Trees: Includes preparation, protection of trees and vegetation, and disposal.
4. Clearing – Removal of Existing Stumps on the Golf Course: Includes preparation, protection of trees and vegetation, and disposal.
5. Clearing – Hand Removal: Includes preparation, protection of trees and vegetation, and disposal.
6. Site Preparation – Strip and Remove Grass with Sod cutter: Includes preparation, removal, and disposal.
7. Site Preparation – Strip and Remove Grass with Equipment: Includes preparation, removal, and disposal.
8. Preparation of Areas for Shaping by Rotovator: Includes preparation and rotovation.

C. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed:

1. Tree Protection Fencing: Linear feet installed, field measured by measuring wheel.
2. Clearing - Mechanical: Area cleared and grubbed, measured by field survey to limits of clearing.
3. Clearing – Selective Removal of Specimen Trees: Each, measured by field count.
4. Clearing – Removal of Existing Stumps on the Golf Course: Each, measured by field count.
5. Clearing – Hand Removal: Area cleared, measured by field survey to limits of clearing.
6. Site Preparation – Strip and Remove Grass with Sod cutter: Area removed, measured by field survey to limits of removal.
7. Site Preparation – Strip and Remove Grass with Equipment: Area removed, measured by field survey to limits of removal.
8. Preparation of Areas for Shaping by Rotovator: Area rotovated, measured by field survey to limits of removal.

1.5 DEFINITIONS

A. Rotovate: Process of breaking up the top layer of ground with large tractor drawn rotovator.

1.6 MATERIALS OWNERSHIP

A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.7 PROJECT CONDITIONS

A. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Barrier Fence: Tenax 4-foot orange safety fence and posts or equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Golf Course Architect will locate and flag all clearing, including trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 PROTECTION OF TREES AND VEGETATION

A. Erect and maintain a temporary barrier fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

B. Do not clear, damage or disturb trees and vegetation outside the limits of clearing.

1. The limits of clearing must remain in place and be in good repair until the completion of grassing.
2. Once the limits of clearing have been delineated, only the Golf Course Architect may adjust the limits.

C. Do not excavate within drip line of trees, unless otherwise indicated.

D. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

E. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Owner and Golf Course Architect.

1. Employ a qualified arborist or horticulturalist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
2. Replace trees and vegetation that cannot be repaired and restored to full-growth status, as determined by qualified arborist or horticulturalist, to the satisfaction of Owner and Golf Course Architect.
3. Provide watering of replaced trees and vegetation for a minimum of 12 months.
4. If the Owner, at his sole discretion, determines that the Contractor is not diligent in the repair and replacement of damaged trees and vegetation, the Owner may employ whatever means necessary to repair, replace and water trees and vegetation with the cost of such work being deducted from monies owed to Contractor.

3.3 UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

3.4 REMOVAL OF EXISTING INFRASTRUCTURE/ DEMOLITION

A. Remove existing cart path where indicated by Golf Course Architect and dispose of off Owner's property.

B. Demolish and remove existing shelters.

C. Demolish and remove all existing bridges and abutments.

D. Demolish and remove existing stairways on golf course.

E. Demolish and remove other site debris encountered and generated during renovation, including but not limited to:

1. Irrigation material
2. Drainage Pipe
3. Existing Dump Piles left on course

3.5 CLEARING AND GRUBBING

A. Mechanical Clearing: Remove obstructions, trees, shrubs, grass, and other vegetation in locations clearly flagged by Golf Course Architect. Removal includes digging out stumps and obstructions and grubbing roots.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct construction of the golf course.
3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed subgrade.
4. Use only hand methods for grubbing within drip line of remaining trees.

B. Clearing and Grubbing Stages: Perform clearing and grubbing in stages as follows:

1. Clearing and Grubbing Stage 1: Golf Course Architect will locate and clearly flag corridors to permit mass clearing operations to proceed.
2. Clearing and Grubbing Stage 2: Following completion of stage 1 clearing and grubbing, the Golf Course Architect will inspect the site and locate and clearly flag any additional areas for clearing including green and tee sites and cart path routes to permit construction of the golf course.

C. Selective Removal of Specimen trees: Golf Course Architect will inspect the site and locate and clearly flag individual trees, groups of trees cleared using hand and mechanized methods. Selective removal includes removal of lumber, stump grinding to a depth of 10"-12" below subgrade, and removal of ground stump debris.

D. Removal of Existing Stumps: Grind stumps from previously removed trees on golf course. Removal includes removal of lumber, stump grinding to a depth of 10"-12" below subgrade, and removal of ground stump debris.

E. Hand Removal of Small Trees, Shrubs and other Vegetation:. Golf Course Architect will identify trees and vegetation within the jurisdictional areas to be cleared by hand grinding using the following non-mechanized methods:

1. Cut trees and vegetation and remove by attaching chains and/or cables and dragging to an upland location.
2. At no time will machinery with tracks or tires be permitted within the limits of jurisdictional areas.
3. Do not remove stumps.
4. Do not disturb soil by mechanical means.

3.6 STRIP AND REMOVE GRASS

A. Strip and Remove Grass with Sod Cutter: Strip and remove existing turf grass with sod cutter as marked by Golf Course Architect. Haul material to an onsite stock pile or bury pit location located by GCA.

B. Strip and Remove Grass with Excavator: Strip and remove existing turf grass with excavator and grading bucket at a 2” depth as marked by Golf Course Architect. This will occur in areas where large equipment such as dozers and large excavators will perform larger grade changes.

3.7 ROTOVATING

A. Rotovation of Areas being prepped for Minor Grading: Rotovate 4”-6” topsoil layer after stripping turfgrass in select areas. This will occur in areas that have little to no proposed change in grade but need to be loosened to remove thatch layer and allow for minor grading changes to be made easily.

3.8 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, screened stones, and waste materials, including trash and debris, and legally dispose of them off Owner's property. Combustible materials may be burned where permitted by law, and with prior approval of Owner.

1. Burning: Comply with local laws, codes and ordinances, and do not burn materials without proper permits. Use an air curtain incinerator specifically designed for disposal of cleared materials when required.

END OF SECTION 02230

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Excavating and filling for the golf course.
2. Topsoil Stripping and Management.
3. Installation and Maintenance of Erosion Control Measures

B. Related Sections include the following:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions and requirements.
2. Division 1 Section "Unit Prices" for a schedule of unit prices.
3. Division 1 Section "Construction Facilities and Temporary Controls."
4. Division 2 Section "Site Clearing" for tree removal, turf stripping, grubbing, and protecting trees to remain.
5. Division 2 Section "Shaping" for shaping, finish shaping and topsoil replacement.

1.3 ALLOWANCES

A. NA

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Install and Maintain Silt Fence: Includes Install and maintain silt fence according to Erosion and Sedimentation Controls Plans and Details.
2. Install and Maintain Straw Wattles: Includes Install and maintain straw wattles according to Erosion and Sedimentation Controls Plans and Details.
3. Install and Maintain Straw Bails: Includes Install and maintain straw bails according to Erosion and Sedimentation Controls Plans and Details.
4. Excavation and Topload Haul Native Soil Less than 1500 feet: Includes preparation, excavation, fill, toploading, hauling to designated areas on site, and protection.
5. Excavation and Topload Haul Native Soil Greater than 1500 feet: Includes preparation, excavation, fill, toploading, hauling to designated areas on site, and protection.
6. Excavation and Stockpile of Topsoil Haul Less than 1500 feet: Includes preparation, excavation, fill, toploading, hauling to designated areas on site, and protection.

7. Excavation and Stockpile of Topsoil Haul Greater than 1500 feet: Includes preparation, excavation, fill, toploading, hauling to designated areas on site, and protection.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed:

1. Install and Maintain Silt Fence: Linear feet of Silt fence installed. Measured in field with measuring wheel.
2. Install and Maintain Straw Wattles: Linear feet of Straw Wattle installed. Measured in field with measuring wheel.
3. Install and Maintain Straw Bails: Linear feet of Straw bails installed. Measured in field with measuring wheel.
4. Excavation and Toploading Haul Native Soil Less than 1500 feet: Cubic yard of material moved. Measured in field by dump truck load count.
5. Excavation and Toploading Haul Native Soil Greater than 1500 feet: Cubic yard of material moved. Measured in field by dump truck load count.
6. Excavation and Stockpile of Topsoil Haul Less than 1500 feet: Cubic yard of material moved. Measured in field by dump truck load count.
7. Excavation and Stockpile of Topsoil Haul Greater than 1500 feet: Cubic yard of material moved. Measured in field by dump truck load count.

1.5 DEFINITIONS

A. Toploading Haul: Excavating, top loading, hauling and filling to subgrade elevations indicated.

B. Excavation: Removal of material encountered above subgrade elevations.

C. Fill: Soil materials used to raise existing grades.

D. Subgrade: Surface or elevation remaining after completing excavation or fill.

E. Finish Grade: Elevation of finished surface or topsoil, bunker sand, root zone mix or surface soil modified to become topsoil.

F. Utilities include on-site underground pipes, conduits, ducts, and cables.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soils: Soils free of rock or gravel greater than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. The Golf Course Architect will determine if rocky soils are satisfactory.

B. Subsoil: Soils free of rocks greater than 6 inches, debris, waste, frozen materials, vegetation, and other deleterious matter. The Engineer will determine if rocky soils are satisfactory.

C. Topsoil: Natural or cultivated on-site surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials.

D. Fill: Satisfactory soil materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Install all Erosion control measures as specified by Engineer to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways including, but not limited to, straw bales, silt fence, and straw wattles. Refer on the Erosion & Sedimentation Control Plans and Details.

C. Avoid trenching and installing silt fence within the drip line of any and all specimen trees.

3.2 EARTHWORK MANAGEMENT

A. Quantify the amount of subsoil and topsoil required to achieve proposed subgrade and finish grade elevations.

B. Coordinate excavation and delivery of top loaded golf course fill material to all areas of the course. Stake and field direct routes and locations for efficient movement and dumping of golf course fill.

C. Conduct golf course earthwork operations to insure that minimum depths of topsoil are achieved and maintained throughout all areas of work as specified in Division 2 Section “Shaping”. This will be particularly critical in areas of heavy earthworks. Do not contaminate topsoil with any subsoil materials.

3.3 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.

3.4 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil as specified in Division 2 Section "Site Clearing".

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials in locations determined by Golf Course Architect and without intermixing with subsoil. Grade and shape stockpiles to drain surface water.

1. Do not stockpile topsoil within drip line of remaining trees.

D. Screen topsoil of stones 1/2 inch (12 mm) or larger in any dimension and other extraneous materials harmful to plant growth.

3.5 EXCAVATION

A. Perform localized cuts and excavations within the limits of Work as specified in Division 2 Section "Shaping".

B. Topload and haul excavated material to areas designated for fill.

C. Limit earthwork operations to the areas inside Limits of Disturbance shown on the Grading and Cut/Fill Plans and directed in the field by Golf Course Architect.

D. Existing grades in all areas outside of the Limits of Disturbance are to be preserved and protected.

3.6 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. After stripping to the desired grade and performing all necessary excavation, and prior to fill placement, proof roll the stripped surface using a loaded dump truck or equivalent to aid in identifying localized soft or unsuitable materials which should be removed. Remove and replace any soft or unsuitable materials encountered during proof rolling with fill.

C. Receive subsoil and topsoil fill material by end-dump trucks.

D. Place, compact and rough shape subsoil and topsoil fill material in layers to required subgrade and finish grade elevations according to the drawings or as directed by the Golf Course Architect.

E. Rough shaping is specified in Division 2 Section "Shaping."

F. Uniformly spread topsoil to a minimum depth of 6-inches.

G. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

3.7 APPROVAL OF SUBGRADE

A. Notify Golf Course Architect when excavations have reached required subgrade.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Golf Course Architect.

3.8 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place fill material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.9 COMPACTION OF FILLS

A. Place fill materials in layers and moisture conditioned to within +-2% of the optimum moisture content.

B. Place fill materials in layers not more than 8 inches (200 mm) in loose thickness and moisture conditioned to within +-2% of the optimum moisture content.

C. Compact each layer of fill material to not less than 85% of maximum dry unit weight according to ASTM D 698.

3.10 GRADING

A. Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Finish subgrades to required elevations within a tolerance of plus or minus 6-inches.

3.11 APPROVAL OF GOLF COURSE EARTHWORK

A. Notify Golf Course Architect for approval of golf course earthwork when excavations and fills have reached required subgrade/finish grade elevations.

B. Reconstruct grades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Golf Course Architect.

3.12 TOPSOIL REPLACEMENT

A. Topsoil replacement is specified in Division 2 Section “Shaping”.

3.13 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Golf Course Architect; re-grade and re-compact.

C. Where settling occurs before Project correction period elapses, fill with additional soil material, compact, and grade.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Golf Course Architect.

1. Bury waste material, including unsatisfactory soil, trash, and debris as directed by the Golf Course Architect.

END OF SECTION 02300

SECTION 02311 - SHAPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following;
   1. Shaping for the golf course and features (greens, tees, bunkers, cart path)
   2. Management of existing topsoil

B. Related Sections include the following:

   1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions and requirements.
   2. Division 1 Section "Unit Prices" for a schedule of unit prices.
   3. Division 1 Section "Construction Facilities and Temporary Controls."
   4. Division 2 Section "Site Clearing" for site stripping, grubbing, disposal, removing topsoil, and protecting trees to remain.
   5. Division 2 Section Earthwork" for erosion control, topsoil management, approval of subgrade, compaction of fills, and disposal.
   6. Division 2 Section "Greens" for finish shaping.
   7. Division 2 Section "Tees" for finish shaping.
   8. Division 2 Section "Bunkers" for finish shaping.
   9. Division 2 Section "Cart Paths" for finish shaping and preparation.

1.3 ALLOWANCES

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

   1. Shaping: Includes preparation; rough shaping and shaping of greens, tees, fairways, roughs, outer roughs, bunkers, cart path routes and practice range; and protection.
   2. Finish Shaping: Includes preparation; finish shaping of greens, tees, fairways, roughs, bunkers, cart path routes and practice range; and protection.

      a. Includes finish shaping specified in Division 2 Section "Greens."
      b. Includes finish shaping specified in Division 2 Section "Tees."
      c. Includes finish shaping specified in Division 2 Section "Bunkers", excluding edging and hand shaping.

   3. Topsoil replacement includes preparation, testing and protection.

B. Measurement: Use the following methods of measurement to determine actual quantities of work performed:

1. Shaping: Area of work.

1.5 DEFINITIONS

A. Finish Grade: Elevation of finished surface of topsoil, bunker sand, root zone mix or surface soil modified to become topsoil.

B. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath topsoil.

PART 2 - EXECUTION

2.1 PREPARATION

A. Maintain erosion-control measures installed during earthwork to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Remove and replace erosion control measures as required to complete shaping.

2.2 GOLF COURSE SHAPING

A. General: The intent of the drawings is to provide concepts for execution of shaping under supervision of Golf Course Architect. Golf Course Architect reserves the right to change design of greens, tees, bunkers; revise fairway and rough grades; and direct changes to green and bunker shaping, tee angles and placements, fairway slopes and swales, drain locations and cart path routes.

1. Cut, fill and grade to establish continuous shapes that tie-into existing grades including; rolls, twists, humps and hollows, without artificial lines or mounds.
   a. Use the existing landforms as a guide for shaping of fairway and surrounding areas.
2. Provide swales and hollows for golf course drainage.
3. Shape fairways and roughs with positive drainage at a minimum gradient of 2% in sandy soils and 3% in loam or clay soils.
4. Divert surface runoff around tees and bunkers.
5. Provide a smooth transition between adjacent existing grades and new grades, except where noted specifically by the Golf Course Architect.
   a. It is desirable in some areas of the green and bunker surrounds to have quicker shapes and grades that contrast highly with the natural more flat grades of the existing terrain.
6. Most of the golf course features will be shaped with an excavator, grading bucket and/or knuckle bucket.
   a. A larger size excavator is acceptable for larger working areas and longer landforms. A smaller excavator will be needed for most bunker and slope work to execute the detail grading.

B. Shaping: Cut, fill, grade and detail shape inside the limits of disturbance and the cart path tie-ins using an excavator with a knuckle bucket and small crawler tractor with a 6-way blade. Larger areas such as practice fairway can utilize a Caterpillar D6 or equal. The interior areas of the golf course that are accessible are limited to a dozer equal to a Caterpillar D4 or John Deere 550/650.
1. The majority of the work will be executed with an excavator and bucket for shaping of bunkers and some green surroundings.
2. Emphasis is placed on least disturbance and operating equipment inside of the limits of disturbance illustrated on GRADING PLANS.

3. Management of topsoil:
   a. Emphasis is placed on managing the topsoil inside of the areas for grading and shaping.
   b. Native topsoil should be managed and conserved during cut/fill shaping inside contiguous work areas.
   c. Push, strip, and stockpile topsoil from larger cut and fill areas. Cap those areas with desirable topsoil during shaping process. This will require some planning and completing the work in an orderly manner and step by step. Review topsoil management plan with respect to shaping for each area with Golf Course Architect.
4. Removal of Tree Root Matter:
   a. In many areas proposed for shaping there will be root matter in the topsoil layer from removed trees or adjacent trees that are alive. Include in the shaping work the pruning and removal of roots and debris as needed to execute the shaping work.

5. Provide localized cuts and fills up to 5 feet (1.52 m) above or below subgrade elevations within a 200-foot distance. These are considered “push” areas and are included in the shaping pricing. These are areas do not require toploading and moving of material.
6. Dispose of unsatisfactory soil materials according to Division 2 Section "Earthwork."
7. Finish shaping of green subgrades is specified in Division 2 Section "Greens."
8. Finish shaping of tee subgrades is specified in Division 2 Section "Tees."
9. Finish shaping of bunker subgrades is specified in Division 2 Section "Bunkers."
10. Finish shaping of cart path subgrades is specified in Division 2 Section "Cart Paths."

2.3 COMPACTION OF FILLS

A. Compaction of fills is specified in Division 2 Section "Earthwork."

2.4 APPROVAL OF SHAPING AND FINISH SHAPING

A. Obtain approval from Golf Course Architect at the following stages of construction in three to four holes phases:

1. On completion of shaping, prior to golf course drainage installation.
2. On completion of green site finish shaping, including bunkers and green cavity subgrade, prior to green subdrainage installation.
3. On completion of tee finish shaping, prior to laser leveling subgrade.
4. On completion of bunker finish shaping, prior to bunker edging.
5. On completion of finish shaping, prior to topsoil replacement.
6. On completion of topsoil replacement, prior to grass preparation.

2.5 PROTECTION

A. Protecting Shaped Areas: Protect newly shaped areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Repair and reshape as directed by Golf Course Architect.

END OF SECTION 02311

SECTION 02312 - GREENS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Finish shaping of greens subgrade.
2. Subdrainage installation for greens.
3. Gravel layer installation for greens.
4. Root zone material installation for greens.
5. Final leveling for greens surface.

B. Related Sections include the following:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions.

2. Division 1 Section "Alternates" for descriptions and requirements.
3. Division 1 Section "Unit Prices" for a schedule of unit prices.
4. Division 2 Section "Shaping" for finish shaping and topsoil replacement.
5. Division 2 Section "Golf Course Drainage" for connections to gravity flow piping.

1.3 ALLOWANCES

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Subdrainage: Includes trench excavation, piping, fittings, clean-outs, gravel, locator wire and disposal.
2. Gravel Layer: Includes preparation.
3. Plastic Liner: Includes locator wire.
4. Root Zone Mix: Includes preparation, fertilizer and lime, and final leveling.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed.

1. Subdrainage: Length of pipe installed, measured by taping.
2. Gravel Layer: Area of gravel installed, measured by taping.
3. Plastic Liner: Length of liner installed, measured by taping.
4. Root Zone Mix: Area of root zone material installed, measured by taping or GPS.

1.5 DEFINITIONS

A. D15: Gravel with particle diameter below which 15% of the gravel particle by weight are smaller.

B. D85: Root zone mixture with particle diameter below which 85% of soil particle by weight are smaller.

C. HDPE: High density polyethylene plastic.

D. Bridging: Engineering principle which relies on the largest 15% of the root zone mixture particles "bridging" with the smallest 15% of the gravel particles in construction of USGA modified green profiles.

1.6 SUBMITTALS

A. Material Test Reports: For gravel, sand, organic matter and root zone mix, submit soil testing laboratory results and recommendations to the Owner and Golf Course Architect.

B. Record Drawings: For approval of green subgrades, provide green size, shape and subgrade elevations at 10' (3.05 m) grid intervals across the entire floor. Provide clean readable copy to Owner and Golf Course Architect for approval. Provide at 1"=20' (1:250) scale.
1. Compile Record Drawings of the subgrade and finish grade for Owner and Golf Course Architect at completion of project.

C. Closeout Submittals: Provide an accurate scaled drawing of record for final green subgrade elevations, shape, size, location of subdrainage piping, and cleanouts, with references to existing site features. Provide hard copy and electronic copy in CAD format. Submit to Owner and Golf Course Architect.

1.7 QUALITY ASSURANCE

A. Soil-Testing Laboratory Qualifications: A physical soil testing laboratory specializing in professional testing and consulting services for the golf course industry, accredited by the American Association for Laboratory Accreditation (A2LA) for technical competence in the field of Geotechnical Testing, and participating in the USGA Green Section Proficiency Testing Program.

B. Gravel Particle Size Analysis: Furnish analysis by a qualified soil testing laboratory stating particle size range and percent retained by weight.

1. Report recommendations and suitability of gravel for USGA modified putting greens.

C. Sand Particle Size Analysis: Furnish analysis by a qualified soil testing laboratory stating percentages of gravel, sand, silt, and clay including fine sand fractions.

1. Report recommendations and suitability of sand for USGA modified putting greens.

D. Organic Matter Test: Furnish test by a qualified soil testing laboratory stating percent organic matter by weight.
1. Greensmix should be 1% organic matter by dry weight.

2. Report recommendations and suitability of organic matter for USGA modified putting greens.

E. Complete Physical Analysis: Furnish analysis of root zone mix by a qualified soil testing laboratory stating saturated hydraulic conductivity, pore space distribution, bulk density, particle density and water retention using 10%, 15% and 20% organic matter.

1. Report recommendations and suitability of each root zone mix for USGA modified putting greens.

2. As stated above, 1% organic matter by dry weight is specified. Recommendations to modify this standard must be made in writing with testing proof that the alternative is acceptable. Golf Course Architect must approve in writing variations to this standard.

F. Chemical Analysis: Furnish analysis of root zone mix by a qualified soil testing laboratory stating pH and mineral and plant nutrient content.

1. Report lime and fertilizer recommendations for grass type specified in Division 2 Section "Grasses."

G. Source Quality Control Analysis: Furnish analysis of random root zone mix samples stating complete physical and particle size analysis, including organic matter and pH, and recommendations on comparability to the control sample.
1. Control Sample is the Golf Course Architect approved sample that is submitted by the Contractor prior delivery or significant mixing of Greensmix material.
2. Greensmix samples throughout the project must be consistent with the approved control sample.
3. Greensmix samples and testing that meet USGA recommendations described in the above sections, however are not consistent with the control sample are not acceptable. Consistency is defined at the sole discretion of the Golf Course Architect.
4. One testing laboratory used for control samples and testing during construction to ensure consistency.

H. Testing Procedures during Construction: Furnish analysis of root zone mix samples at the plant for every 500 tons of greensmix.
1. Contractor’s representative to take the sample from the mixing plant and send out for analysis.
2. Golf Course Architect to review and approve analysis and testing results from the mixing plant before the 500 tons is shipped to the jobsite. Approval to be made in writing.
3. Contractor to keep file of all testing results at the jobsite, readily available for review and reference by all parties.
4. Upon approval, the Greensmix is shipped and installed directly into the green well.
5. Stockpiling of approved greensmix material on-site is not allowed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. HDPE Solid and Perforated Pipe and Fittings:

a. Hancor
b. Advanced Drainage Systems, Inc.

2.2 MATERIALS

A. Drainage Piping: 4-inch (100mm) high density polyethylene pipe and fittings, AASHTO M252 or M294, having smooth interior and annular exterior corrugations, and slots for water inflow.

B. Gravel: 1/4-inch x 1/8-inch (2mm - 6mm) hard, non-decomposable, freshwater-washed, pea gravel meeting USGA recommendations for putting greens without an intermediate (choker) layer indicated below:

Performance Factors	Recommendations
Bridging Factor	D15 (gravel) less than or equal to 5 x D85 (root zone)
Permeability Factor	D15 (gravel) greater than or equal to 5 x D15 (root zone)
Uniformity Factors	D90 (gravel) / D15 (gravel) is less than or equal to 2.5 No particles greater than 12 mm Not more than 10% less than 2 mm Not more than 5% less than 1 mm

C. Root Zone Mix: Putting green root zone mixture consisting of sand and organic matter, meeting USGA physical property and particle size recommendations.
   1. In addition to USGA recommendations the Greensmix will further meet the following requirements:
      a. Percolation rate of 16 inches/hour minimum. (400mm/hour).
      b. Compatible in particle size with the selected bunker sand for the project.
      c. We recommend a 90/10 ratio for initial mixing and testing.
   2. **Organic Matter**
      a. The organic component specified is ALL-GROW.
      b. See GROW-IN PROGRAM for additional details.

D. Plastic Liner: 30 mil thick and 16 inches (400 mm) wide polyethylene.

2.3 SOURCE QUALITY CONTROL

A. Source quality control is required for greens materials. Comply with the following:

   1. Randomly sample and test each gravel and root zone mix stockpile at the off-site location prior to delivery to the job site.
   2. If any source quality control sample does not comply with the approved material analysis, immediately stop material supply and notify Golf Course Architect.
   3. All samples and testing results must be approved in writing before Greensmix can be shipped to the jobsite.

PART 3 - EXECUTION

3.1 PREPARATION

A. Testing: Complete testing of green, approach and tee materials as follows:

   1. Send samples of root zone materials to soil testing laboratory for analysis as specified in "Quality Assurance" article.
   2. Send samples of different gravel materials to the laboratory with the root zone materials for analysis as specified in "Quality Assurance" article. The lab will first determine the best root zone mix, and will then test the gravel samples to determine if they meet USGA recommendations for modified putting greens.
   3. Complete chemical analysis of final approved root zone mix as specified in "Quality Assurance" article.

B. Mix all root zone components off-site using mechanical equipment. Supply a totally homogeneous, uniform mix.

1. The type and percentage of organic matter will be determined by Turf Consultant and Golf Course Architect.

3.2 FINISH SHAPING

A. Upon completion of bulk earthworks and prior to final shaping, compact subgrade by mechanical means to 85% of maximum dry unit weight according to ASTM D 698 ensure minimal future differential settlement.

B. Shape subgrade parallel to the final shape of the green surface as indicated in detail sketches G1 and G2.

C. Construct the green subgrade and surrounding subgrade as a continuous and flowing shape, with the green subgrade 16 inches (400 mm) below the proposed finish surface grade.

D. Maintain subgrade slopes and gradients as follows:

1. Pinable Areas: 1% to 4%.
2. Non-Pinable Areas: 5% to 12%, including rolls and swales.

E. Prior to subgrade inspection and approval for drainage, record subgrade elevations at 10' (3.05 m) grid intervals across the entire floor of the green.

1. Record elevations on a scaled record drawing showing slope percentages of rolls, swales and pinable areas.
2. Show dimensions and size of the green.

F. Amend subgrade elevations and shapes as directed by the Golf Course Architect, maintaining a flowing, undulating shape which satisfies the design intent.

G. Smooth and compact subgrade to not less than 85% of maximum dry unit weight according to ASTM D 698. Do not use vibratory rollers for compaction.

H. Subgrade must be free of rock and debris to ensure a smooth and continuous shape that will drain freely.
1. Rocky material greater than ½” inch (12.5 mm) diameter must be removed.
2. Depressions or other low areas in the subgrade caused by poor soil conditions (including rocky subgrade) shall be filled with acceptable soil and compacted to provide a smooth and continuous subgrade that will not experience settling at a later time.

3.3 SUBDRAINAGE INSTALLATION

A. General: The location and arrangement of drainage piping will be determined verified by the Golf Course Architect.

B. Layout of Drainage: The location and arrangement of the drainage piping must be approved by the Golf Course Architect. Generally, pipes and outlets will be located to intercept water flow across the green subgrade as indicated in DRAINAGE PLAN DETAILS and FEATURE CONSTRUCTION DETAILS.

1. Layout a pattern of drainage pipes with a main line(s) along the line of maximum fall.
2. Locate lateral lines across the slope of the subgrade and extending to the perimeter of the green. Allow a natural fall to the mainline and all laterals.
3. Do not space lateral lines more than 15 feet (4.57 m) apart.
4. Locate perimeter drainage pipes in low areas along the perimeter of the green, adjacent to the main line's exit from the green, to facilitate drainage of water that may accumulate at the low end of that drainage area. Extend pipes to the ends of the first set of laterals.

C. Plastic Liner: Edge green cavity with vertical walls and smooth curves as directed by the Golf Course Architect. Remove and dispose of spoils from green cavity. Install plastic liner and perimeter locator wire firmly against wall of green cavity, and secure with grade stakes. Mark grade stakes for gravel layer and root zone layer.

D. Drainage Trenches: Excavate 10-inch x 10-inch (250 mm x 250 mm) trenches for drainage pipe into a thoroughly compacted subgrade parallel to the surface of the green unless otherwise directed.

1. Excavate trenches with walk behind trencher with 10" (250mm) cutting chain width.
   a. Remove spoils with shovels and rakes. Maintain approved subgrade throughout.
   b. Transport spoils from green well with tractor that has turf tires to minimize the disturbance to the subsurface. Tractor cannot turn in the subgrade of green. Maintain one entrance/exit point into the green subgrade. Removal of spoils with wheelbarrows and buckets also acceptable.
   c. Skid loaders and other equipment with deep tread tires or tracks not acceptable.

2. Excavate trenches with vertical walls and without lips that would prevent water movement into the trenches.
3. Provide smooth, clean trench bottoms compacted to provide a firm, solid bed for drainage pipes with a minimum slope of 1%.
4. Remove excavated soil material from the green subgrade cavity and dispose of as directed by the Golf Course Architect.

E. Drainage Pipe Installation: Place supporting layer of gravel over trench bottom to compacted depth of 2 inches (50 mm). Pre-cut and pre-assemble drainage pipe and place in center of trench. Place locator wire beside pipe in trench. Add gravel to fill trench and thoroughly compact without displacing pipe. Fill to green cavity subgrade.

1. Use water proof splices for all wire connections.

F. Junctions: Join and connect all drainage pipes using manufacturer approved HDPE soil tight fittings.

1. Do not push one pipe into another and join with tape.
2. Connect lateral lines to main lines using 45 or 90 degree elbow joints laid in the direction of water flow.
3. Provide caps on the top end of each lateral line.
4. Provide a clean out for each separate main line.
   a. Clean out standpipe shall be solid pipe.
   b. Cap standpipe 6" (150mm) below the finish surface and furnish a metal disk or other approved marker so that the location of the clean out can be identified with a metal detector.

G. Discharge Pipe: Connect subdrainage to golf course drainage at the green junction pit.

3.4 GRAVEL LAYER INSTALLATION

A. Place grade stakes at frequent intervals over the green subgrade and mark them for gravel drainage blanket layer and root zone layer.

B. Cover entire subgrade with a layer of clean gravel to a minimum thickness of 4 inches (100 mm), conforming to the proposed final surface grade plus or minus .5 inch (12.5 mm). Place gravel layer immediately after subdrainage installation to prevent washing of subgrade fines into the drainage trenches.

C. Do not place or spread gravel on the subgrade surface during rainfall or while the subgrade remains wet from previous rain.

D. Do not damage or dislocate subdrainage while spreading gravel.

E. Start placement of drainage gravel at one edge and progress across the subgrade surface.
   1. Maintain approved subgrade throughout.
   2. Transport gravel from stockpile to green well with tractor that has turf tires to minimize the disturbance to the subsurface. Tractor cannot turn in the subgrade of green. Maintain one entrance/exit point into the green subgrade. Installation of gravel with wheelbarrows and buckets is also acceptable.
   3. Skid loaders and other equipment with deep tread tires or tracks are not acceptable.
   4. Equipment cannot cross-over installed drain lines.
   5. Spread and smooth topsoil with rakes and shovels. Equipment such as dozers, tractors, backhoes, and trackhoes cannot drive onto and/or spread gravel layer.

F. Provide a smooth finished drainage gravel surface free from footprints or depressions.

G. Rock layer will follow the contours of the original subgrade exactly.

H. Golf Course Architect to approve gravel layer prior to installation of Rootzone. To avoid contamincation the gravel layer should not remain exposed for more than a few days before rootzone mix is installed.

3.5 ROOT ZONE MIX INSTALLATION

A. General: After completion of the drainage installation, place root zone mix over the entire gravel blanket layer to a minimum compacted depth of 12 inches (300 mm), plus or minus 0.5 inches (12 mm), to mirror the shape of the subgrade.

B. Push root zone mix onto the gravel drainage layer in one even thickness using a small crawler tractor or similar machine with low ground pressure. Maintain a cushion of root zone mix between the gravel layer and the tracks or tires of the spreading machine.

C. Prevent contamination of the root zone mix by thoroughly cleaning wheels or tracks prior to pushing mix. Remove and replace any contaminated root zone mix.

D. Compact root zone mix by track rolling, watering and/or the use of manually operated water-filled rollers.

E. Mechanically compact green edges on each side of the interface liner with a vibratory tamp. During compaction, prevent flattening or otherwise altering the intended putting surface.

F. Drag or board float finished green surface to achieve a smooth and uniform surface.

G. Heavily irrigate the green site prior to planting to ensure proper settling and to check for depressions or other unwanted irregularities in the surface.

3.6 FINAL LEVELING

A. After greens have been compacted and topsoil replaced on green surrounds, grade and float green surface for the final time. Evenly and smoothly blend the green surface into the final surrounds.
   1. Extra care should be taken to compact the soil on both side of the plastic liner before and during final leveling. The topsoil and subsoil outside of the green should be compacted as needed to avoid settling outside the green. See compaction standards for soil in this Section and Division 2 Section “Earthworks”.

2. At time of final leveling and prior to grassing the plastic liner must be trimmed below surround elevation. No part of the liner shall protrude or extend above the finish grade of the green or surround.

3.7 FIELD QUALITY CONTROL

A. Inspections: Notify Golf Course Architect when green subgrades have been shaped and before drainage installation, and after placement of the root zone mix and final leveling.

3.8 PROTECTION

A. Prevent silt and debris from contaminating the green materials by erecting silt fence around the perimeter in areas that are subject to surface drainage from the surrounds.

PART 4 - ALTERNATES

END OF SECTION 02312

SECTION 02313 - TEES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Final shaping of tee surfaces.
2. Root zone blending for tee surface.
3. Root zone material installation for tees.
4. Laser leveling for tee subgrades and finish grades.

B. Related Sections include the following:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions.
2. Division 1 Section "Unit Prices" for a schedule of unit prices.
3. Division 2 Section "Shaping" for tee subgrade shaping.
4. Division 2 Section "Greens" for subdrainage and root zone mix specifications.
5. Division 2 Section "Golf Course Drainage" for connecting to gravity flow piping.

1.3 UNIT PRICES

A. Payment: The following unit prices establish the basis of payment for work in this Section:

1. Laser Leveling: Includes subgrade and finish grade.
2. Root Zone Mix: Includes preparation, installation, and protection.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities or work performed:

1. Laser Leveling: Area leveled, measured by survey, taping, or GPS measurement.
2. Root Zone Mix: Area of root zone material installed measured by survey, taping, or GPS measurement.

1.4 DEFINITIONS

A. HDPE: High density polyethylene plastic.

B. Laser Leveling: Use of a small tractor pulled box scraper equipped with a laser controlled leveling blade to establish a constant subgrade or finish grade gradient.

1.5 SUBMITTALS

A. Closeout Submittals: Provide an accurate scaled drawing of record for final tee shape, size, location of subdrainage piping, and location of clean-outs, with references to existing site features. Provide an electronic and hard copy in CAD format. Submit to Owner and Golf Course Architect.

1.6 QUALITY ASSURANCE

A. Quality Assurance for sand material and their installation are specified in Division 2 Section "Greens."
   1. Provide regular testing of the tee rootzone mix in accordance with the Division 2 Section “Greens”.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Manufacturers are specified in Division 2 Section "Greens."

2.2 MATERIALS.

A. Materials for approved sand are specified in Division 2 Section "Greens."

B. Tee Rootzone Mix: Approved sand mixed with native topsoil from the site.
   1. Blend 80 percent approved sand with 20 percent approved topsoil collected and stockpiled on-site.
   2. Select clean well-draining dry area on pavement to blend the rootzone mix. Follow best practices for keeping the blending site clean and the mixing equipment clean.
      a. Golf Course Architect and Turf Consultant to review and approve prepared rootzone mix prior to installation on tees. Rootzone mix that is contaminated or containing deleterious debris will be rejected.

2.3 SOURCE QUALITY CONTROL

A. Source quality control for sand supplied is specified in Division 2 Section "Greens."

PART 3 - EXECUTION

3.1 PREPARATION

A. Preparation is specified in Division 2 Section "Greens."

3.2 FINISH SHAPING

A. Upon completion of bulk earthworks and prior to final shaping, compact tee subgrade to 85% of maximum dry unit weight according to ASTM D 698 by mechanical means to ensure minimal future differential settlement.
   1. Slopes and shoulders of tees should be given particular attention in terms of final grade and sub-grade shaping and achieving the compaction rates referred to above.
   2. All tee surrounds and shoulders should be mechanically compacted by tracking or wheel packing with a small dozer or tractor.

B. Shaping of tees surface and surrounds is important to achieving desired alignment and dimensions. Refer to FEATURE CONSTRUCTION DETAILS
   1. Contractor to lay out tees for grading and compaction as rectangles with staking at the corners to reinforce the alignment and the consistent width to the tees.
   2. The finish shape will not be square. After laser leveling of subgrade and before rootzone installation the "rounded" corners of the tees should be established. These same points will be re-established in the finish rootzone mix to indicate the mown tee top surface.
   3. Alignment of the tees should be to the landing area post (par 4's and 5's) or green center (par 3's), unless otherwise indicated by the Golf Course Architect.

C. Establish a constant 1% subgrade gradient in one direction. Pitch the subgrade in the same direction as the surrounding slope or as directed by Golf Course Architect.
   1. The general rule for all teeing areas is a 1% cross-slope away from the cart path. The tee is level from front to back.
   2. Exceptions to be approved by Golf Course Architect. Typical Exceptions include:
      a. Extreme downhill tee shots will have a 1% slope from back to front. The tee is level from side to side.
      b. Extreme uphill tee shots will have a 1% slope from front to back. The tee is level from side to side.

D. If the tee is benched into a slope, provide a swale adjacent to the tee on the up-slope side to direct run-off away from the tee surface. A swale is not necessary if the up-slope leads to an adjacent tee.

E. Uniformly laser level subgrade to a smooth surface, free from irregular surface changes. Maintain 1% gradient plus or minus 0.05 feet (15 mm).

   1. Cut out soft spots and trim high spots to comply with surface tolerance and compaction requirements.

F. Golf Course Architect to approve tee tops after sub-grade laser leveling prior to installation of tee rootzone mix.

3.3 SUBDRAINAGE INSTALLATION – N/A

3.4 ROOT ZONE MIX INSTALLATION

A. General: After approval of sub-grade surface, place tee rootzone mix over the entire tee subgrade to a minimum compacted depth of 6 inches (150mm), plus or minus 0.05 feet (15 mm).
   1. The tee rootzone mix will blend into the surrounding slope. Refer to FEATURE CONSTRUCITON DETAILS. This is necessary because we will not have a "tee well" constructed and no sub-surface tee drainage.

B. Push tee rootzone mix onto the tee subgrade in one even thickness using a small crawler tractor or similar machine with low ground pressure. Maintain a cushion of root zone mix between the subgrade and the tracks or tires of the spreading machine.

C. Prevent contamination of the root zone mix by thoroughly cleaning wheels or tracks prior to pushing mix. Remove and replace any contaminated root zone mix.

D. Compact root zone mix by track rolling, watering and/or the use of manually operated water-filled rollers.

E. Irrigate the tees prior to planting to ensure proper settling and to check for depressions or other unwanted irregularities in the surface.

3.5 FINAL LEVELING

A. After tees have been compacted, uniformly laser level finish grade to a smooth surface, free from irregular surface changes. Maintain the same 1% gradient established for the subgrade so the depth of root zone mix is a constant 6 inches over the tee surface (150mm) plus or minus 0.05 feet.

3.6 FIELD QUALITY CONTROL

A. Inspections: Notify Golf Course Architect when green subgrades have been established and before drainage installation, and after placement of the root zone mix and final leveling.

3.7 PROTECTION

A. Protecting Laser Leveled Tees: Protect newly leveled tee surfaces from traffic and erosion.

B. Repair and reestablish grades where completed or partially completed tee surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

END OF SECTION 02313

SECTION 02314 - BUNKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Finish shaping of bunkers.
2. Subdrainage installation for bunkers.
3. Formal Bunker sand placement.
4. Formal Bunker Edging, preparation, and grassing.

B. Related Sections include the following:
1. Division 1 Section "Unit Prices" for a schedule of unit prices.
2. Division 2 Section "Shaping" for finish shaping and topsoil replacement.
3. Division 2 Section "Greens" for subdrainage specifications.
4. Division 2 Section "Golf Course Drainage" for connecting to gravity flow piping.

1.3 ALLOWANCES

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Edging and Hand Grading: Includes disposal.
2. Subdrainage: Includes trench excavation, piping, fittings, clean-outs, gravel, locator wire and disposal.
3. Formal Bunker Sand: Includes testing.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine the actual quantities of work performed:

1. Edging and Hand Grading: Area of subgrade graded, measured by GPS (sub-meter accuracy), measurement by taping is acceptable if pre-approved in writing by Golf Course Architect.
2. Subdrainage: Length of pipe installed, measured by taping.
3. Bunker Sand: Area of bunker sand installed, measured by GPS (sub-meter accuracy.

1.5 SUBMITTALS – QUALITY ASSURANCE

A. Bunker Sand Quality Control Analysis: Furnish analysis of bunker sand samples stating complete particle size analysis; Bunker Sand Analysis (pentrometer values, crusting, color); Particle Shape/Size Parameters/Ksat (infiltration rate).

1. Control Sample: The Golf Course Architect approved sample that is submitted by the Contractor prior to delivery or significant screening/stockpiling of bunker sand material at the source.
2. Bunker sand samples throughout the project must be consistent with the approved control sample.
3. Greensmix samples and testing that meet the USGA recommendations and Golf Course Architects specifications, however are not consistent with the control sample are not acceptable. Consistency is defined at the sole discretion of the Golf Course Architect.
4. One testing laboratory used for control samples and testing during construction to ensure consistency.

B. Testing Procedures during Construction: Furnish analysis of bunker sand samples at the plant for every 200 tons of bunker sand.
1. Contractor's representative to take the sample from the source plant and send out for analysis.
2. Golf Course Architect to review and approve the analysis and testing results from the mixing plant before the 200 tons is shipped to the jobsite. Approval made in writing.
3. Contractor to keep file of all testing results at the jobsite, readily available for review and reference by all parties.
4. Upon approval, the bunker sand is shipped and stockpiled in a location with a smooth subgrade, clear of debris, and kept free of contaminants throughout construction. Contractor responsible for all contamination of bunker sand until installed and the hole is turned over to the Owner.

C. Closeout Submittals: Provide an accurate scaled drawing of record for final bunker shape, size, location of subdrainage piping, and location of clean-outs, with references to existing site features. Electronic and hard copy format in CAD based program. Submit to Owner and Golf Course Architect.

D. Provide samples of bunker sand to Golf Course Architect for selection by color in addition to testing and quality procedures described in this Section.
1. Sand approved by testing will also need to be approved by color and consistency by providing a small sample initially. Upon request by GCA, a larger sample (one truck) should be delivered and spread for review of color consistency and compaction. Then final approval can be given.
2. Provide pricing information for each sample and indicate how it varies from the sand selected and included in the base bid price.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Manufacturers for HDPE pipe and fittings are specified in Division 2 Section "Greens." Subject to compliance with requirements, provide products by one of the following:

2.2 MATERIALS

A. Drainage Piping: Drainage piping materials are specified in Division 2 Section "Greens."

B. Gravel: Gravel materials are specified in Division 2 Section "Greens."

C. Formal Bunker Sand: Contractor to submit white or light colored sand from local or regional suppliers.
1. Supplier: as submitted by contractor for Golf Course Architect approval.

2.3 SOURCE QUALITY CONTROL

A. Source quality control for gravel is specified in Division 2 Section "Greens."

B. Source quality control for bunker sand is specified in Division 1 Section “Bunkers”.

PART 3 - EXECUTION

3.1 PREPARATION

A. Testing: Test bunker sand materials as specified in Part 1 "Quality Assurance" Article.

3.2 FINISH SHAPING, EDGING AND HAND GRADING

A. Prior to final shaping, compact bunker subgrade by mechanical means to 85% of maximum dry unit weight according to ASTM D698 to ensure minimal future differential settlement.

B. Shape bunker with mini-excavator and knuckle bucket, similar to John Deere 80C, to establish sweeping curves in all directions as indicated in FEATURE CONSTRUCTION DETAILS and DRAINAGE PLAN DETAILS, or as directed by Golf Course Architect. Larger track-hoe and knuckle bucket must be submitted for approval by Golf Course Architect. The Golf Course Architect will direct field changes to the outlines, shapes, subgrade elevations, and surrounds of the bunkers to achieve desired appearance and golf strategy.

C. Remove bunker spoils and dispose of in locations determined by Golf Course Architect. Soil material removed from bunkers will not be suitable as a capping material on bunker surrounds due to rocks, clay, and other deleterious materials.
   1. Contractor to remove spoils from the golf hole to an area agreed upon with Golf Course Architect.

D. Shape bunker surrounds to minimize storm water runoff into bunkers. Blend bunker shapes into the surrounding landforms so they appear to be a structured part of the natural terrain and not separate man-made shapes.

E. Edging and Hand Grading: After approval of the shaping and excavation by Golf Course Architect, hand edge and grade the bunker as directed.
   1. Care should be taken so as not to flatten or soften the subgrade shapes and slopes.
   2. At this point the bunker edging lines will be indicating in paint by the Golf Course Architect and flagged by the Contractor to maintain the location. No edging to occur prior to the Golf Course Architect painting the initial edging line. This is important for maintaining compaction of the sub-grade.
   3. Cut and trim edges as indicated. Edges should be cut at 5-6 inches in depth. Hand grade bunker to provide a smooth, clean, firm subgrade for drainage installation.
   4. Inform Golf Course Architect when edging and subgrade work is complete for approval. Execute modifications as directed by GCA. Upon approval, subdrainage installation can proceed.

3.3 SUBDRAINAGE INSTALLATION

A. Layout of Drainage: Golf Course Architect will layout subdrainage as indicated in DRAINAGE PLAN DETAILS and FEATURE CONSTRUCTION DETAILS

B. Drainage Trenches: Excavate 10-inch x 10-inch (250 mm x 250 mm) trenches for drainage pipe into a thoroughly compacted subgrade as indicated.

   1. Excavate trenches with vertical walls and without lips that would prevent water movement into the trenches.

2. Provide smooth, clean trench bottoms compacted to provide a firm, solid bed for drainage pipes with a minimum slope of 0.5%.
3. Remove excavated soil material from bunker and dispose of as directed by Golf Course Architect.

C. Drainage Pipe Installation: Place supporting layer of gravel on trench bottom to compacted depth of 2 inches (50 mm). Pre-cut and pre-assemble drainage pipe and place in center of trench. Place locator wire beside pipe in trench. Add gravel to fill trench and thoroughly compact without displacing pipe. Fill to bunker subgrade.

1. Use water proof splices for all wire connections.

D. Junctions: Junctions are specified in Division 2 Section "Greens."

E. Discharge Pipe: Discharge pipe is specified in Division 2 Section "Greens." Use green junction pits for subdrainage connection to golf course drainage.

3.4 FORMAL BUNKER SAND INSTALLATION

A. Remove all debris and contamination from bunker floor prior to sand installation. Place sand in bunker and spread to a compacted depth of 4 inches (100mm) plus or minus 1/2” (12.5mm). Compact sand by hand tamping, or vibratory hand tamp. Larger bunkers can use a sandpro or similar bunker rake to wheel pack and compact the sand.

B. Leave sand a few inches back from perimeter to allow for the hydroseed or sod to knit into surrounding soil. Golf Course Architect to approve bunkers prior to spreading of sand to perimeter. Do not leave a “mound” of additional sand material near the bunker edge.
1. The desired finished result is 4” of compacted sand depth throughout the bunker with slight 1-2” sod/grass lip above the sand level at the bunker edge.
2. All debris and contamination must be removed from the bunker sand after the sodding and/or hydroseeding is complete.
3. Provide a compacted smooth raked finish

3.5 FIELD QUALITY CONTROL

A. Inspections: Notify Golf Course Architect when bunker subgrades have been shaped to approve topsoil installation.
1. Notify Golf Course Architect when topsoil installation is complete to approve irrigation installation, edging and final hand grading of bunker floor.
2. Notify Golf Course Architect when bunker edging and final hand grading of floor is complete to approve for subgrade drainage installation.

3.6 PROTECTION

A. Repair and reestablish grades where completed or partially completed bunker surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Install erosion control measures on the slope above the bunker as necessary to protect the completed work.
2. Sodding and/or hydroseeding should proceed immediately after the installation of liner and sand into the bunkers.

END OF SECTION 02314

SECTION 02630 - GOLF COURSE DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes storm drainage and filter drainage for the golf course.

B. Related Sections include the following:
1. Division 1 Section "Unit Prices" for a schedule of unit prices.
2. Division 2 Section "Greens" for 6-inch subdrainage piping connecting to golf course drainage.
3. Division 2 Section "Tees" for 4-inch subdrainage piping connecting to golf course drainage.
4. Division 2 Section "Bunkers" for 4-inch subdrainage piping connecting to golf course drainage.

1.3 ALLOWANCES

A. N/A

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. 4-Inch (100mm) Filter Drains: includes piping excavation, sand backfill, gravel backfill, fittings and locator wire.
2. 4-Inch (100mm) Gravity Flow Piping: Includes excavation, backfill, fittings and locator wire.
3. 6-Inch (150mm) Gravity Flow Piping: Includes excavation, backfill, fittings and locator wire.
4. 12-Inch (300 mm) Gravity Flow Piping: Includes excavation, backfill, fittings and locator wire.
5. 12-Inch (300mm) Inline Drain: Includes perforated risers, 4” perforated pipe with wire and rock, drainage fill, grates, adapters, fittings, and protection.
6. Exfiltration Trench: includes excavation, gravel, sand, preparation, erosion and sedimentation controls, clean-up and soil stabilization.
7. Outfall Construction: includes excavation, stone, preparation, clean-up and soil stabilization.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed:

1. 4-Inch (100 mm) to 12-Inch (300 mm) Piping: Length of pipe installed, measured by taping, or GPS.
2. Inline Drain Measurement: Each inline drain installed, measured by field counting.
3. Exfiltration Trench: Each installed.
4. Outfall Construction: Each installed.

1.5 DEFINITIONS

A. HDPE: High density polyethylene plastic.

B. PVC: Polyvinyl chloride plastic.

C. Backfill: Acceptable soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over the pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

D. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

E. Trench Excavation: Removal of material encountered above trench subgrade elevations.

F. Subgrade: Surface or elevation remaining after completing excavation, or top surface of backfill.

1.6 SUBMITTALS

A. Closeout Submittals: Provide an accurate scaled drawing of record for the location of all installed gravity flow piping and inline drains, with references to existing site features. Submit to Owner and Golf Course Architect. Must be accurate to sub-meter GPS standards. Hard copies and digital map copies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. HDPE Solid and Perforated Pipe and Fittings:
   a. Hancor
   b. Advanced Drainage Systems, Inc.
   c. Or approved equal

2. Inline and Cart Path Drains:
   a. Nyloplast America Inc.
   b. Or approved equal

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.3 MATERIALS

A. HDPE Pipe and fittings: AASHTO M252 or M294, having smooth interior and annular exterior corrugations.

1. Perforated Pipe: HDPE pipe with square cut ends and slots for water inflow.

B. 12-Inch (300 mm) Inline Drains: Nyloplast PVC surface drain with 12-inch (300mm) round cast iron grate (drop-in grate). Stand pipe constructed of PVC material, with H-20 rated cast iron grates. Provide adapters as needed.

C. Drainage Fill: Washed pea gravel. Same materials as approved for greens drainage.
   1. Filter Drains and Exfiltration Trenches: Washed pea gravel and approved sand.
      a. Pea Gravel: same as approved for greens drainage.
      b. Sand Backfill: same as approved for tee surfaces (no soil amendment).

D. Rip-Rap Rock: Rubble or rock placed at the outfall as referred to in the DRAINAGE PLAN DETAILS
   1. Rock should be less than 9” in size and greater than 1”.
   2. Free of debris and fines.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

B. Subdrainage Piping: Corrugated HDPE perforated drainage pipe and fittings, soil-tight couplings, and coupled joints.

C. Gravity-Flow Piping: Corrugated HDPE drainage pipe and fittings, soil tight couplings, and coupled joints.

D. Drains in Approaches, Fairways and Roughs: 12-inch (300mm) round inline drains and 6

E. Exfiltration Trenches: pipe, gravel, sand.

F. Outfall Construction: flared end sections, rip-rap rock.

3.2 DEWATERING

A. Dewatering for excavation is specified in Division 2 Section "Earthwork."

3.3 SUBDRAINAGE PIPING INSTALLATION

A. Trench Excavation: Excavate trenches to provide a horizontal distance of at least 6 inches (150 mm) between pipe and trench walls. Grade bottom of trench excavations to a 0.5% minimum gradient and compact to firm, solid bed for drainage system.

   1. Excavate trenches to allow installation of top of pipe to 36-inches (90cm) below subgrade.

B. Drainage Fill: Place supporting layers of drainage fill over trench bottom to compacted depth of not less than 4 inches (100 mm). After installing drainage piping, add drainage fill to within 12 inches (300 mm) of finish grade.
   1. Refer to DRAINAGE PLAN DETAILS

C. Fill to Subgrade: Place native fill material over drainage fill. Place material in loose-depth layers not exceeding 6 inches (150 mm). Compact each layer of backfill to not less than 85% of maximum dry unit weight according to ASTM D 698.

3.4 GRAVITY FLOW PIPING INSTALLATION

A. Trench Excavation: Excavate trenches to uniform widths to provide a working clearance on each side of pipe. Excavate and shape trench bottoms to provide uniform bearing and support of pipes. Remove projecting stones and sharp objects along trench subgrade.

1. Excavate trenches to allow installation of top of pipe 36-inches (90cm) below subgrade.
2. Excavate trenches to a 0.5% minimum gradient for gravity flow of water to outfalls.
3. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course of subgrade material free of particles larger than 1 inch (25 mm).

B. Backfill: Place and compact initial backfill of subgrade material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the pipe.

1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of piping to avoid displacement of pipe or future settling of trenches.

C. Place and compact final backfill of subgrade material to final subgrade.

D. Compact each layer of backfill to not less than 85% of maximum dry unit weight according to ASTM D 698.

3.5 EXFILTRATION TRENCH INSTALLATION

A. Trench Excavation: Excavate trench to uniform widths as illustrated in DRAINAGE DETAIL PLANS.
1. Prior to excavation temporary erosion and sedimentation controls must be installed.
2. Care should be taken to avoid disruption of the streambank during excavation.
3. Keep work area clean and free of spoil piles. Excavation material must be removed directly in a truck or trailer.

B. Backfill: Place gravel and sand materials as indicated in the DRAINAGE DETAIL PLANS.
1. Care should be taken to avoid disruption of the stream bank during backfill and placement of materials.
2. Backfill trench directly after excavation to avoid safety issues and to avoid the trench filling with groundwater, rain water, or run-off from the stream.

3.6 OUTFALL CONSTRUCTION

A. Excavation: Shallow excavation of a swale to the dimensions detailed on the DRAINAGE PLAN DETAILS.
1. Care should be taken to avoid disruption of surrounding turfgrass and soil.
2. Keep work area clean and free of spoil piles. Excavation material must be removed directly in a truck or trailer.

B. Rip-Rap Rock: Placement of rock material as illustrated in DRAINAGE PLAN DETAILS.
1. Keep site clean and free of debris.
2. Rock placement should extend uphill past the flared end section of the pipe to avoid run-off erosion under the outfall field.
3. Place adequate amount of rock to diffuse run-off water and prevent slope erosion inside the outfall field and below the field.

3.7 INSTALLATION, GENERAL

A. General Locations and Arrangements: Locations and arrangement of underground golf course drainage piping will be finalized in the field by Golf Course Architect.

B. Install piping beginning at low point with unbroken continuity of invert. Place bell ends of piping facing upstream. Install couplings according to manufacturer's written instructions.

C. Install drainage piping with riser pipes at each inline drain or cart path drain location. Leave top of riser pipe above grade to prevent soil and debris from entering pipes during shaping of the golf course.
1. Refer to DRAINAGE PLAN DETAILS.

D. Use fittings for branch connections.

E. Install 14-guage locator wire on initial backfill directly over pipe. Use waterproof splices for all wire connections.

F. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

G. Install flared end sections on 6 inch (150 mm) and larger pipe at all swale and culvert outlets to minimize erosion.

H. Install frog flaps or equivalent on the outlet of all 4 inch (100 mm) pipes discharging directly into out-of-play areas.

3.8 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. PE Pipe and Fittings: Join pipe, tubing, and fittings with couplings for soil tight joints according to manufacturer's written instructions.

3.9 INLINE DRAIN INSTALLATION

A. Install inline drains in locations determined by Golf Course Architect.

B. Install inline drains in turf areas during turf preparation as specified in Division 2 Section "Grasses" and prior to sodding.

C. Fasten grates to drains if indicated.

D. Set drain frames and covers with tops flush with finish grade.

3.10 PROTECTION

A. Prevent silt and debris from entering installed piping by erecting silt fence and/or straw bales around each inline drain location until completion of sodding.

PART 4 - ALTERNATES

END OF SECTION 02630

SECTION 02751 - CART PATHS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Asphalt Cart Path
2. Extruded Concrete Curbing
3. Maintenance Path
4. Concrete Practice Tee Pad

B. Related Sections include the following:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions and requirements.
2. Division 1 Section "Alternates" for descriptions and requirements.
3. Division 1 Section "Unit Prices" for a schedule of unit prices.
4. Division 2 Section "Earthwork" for aggregate subbase and base courses.
5. Division 2 Section "Shaping" for shaping, finish shaping and topsoil replacement.

1.3 ALLOWANCES

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section. Payment and measurement for Part 3 Article "Finish Shaping" is specified in Division 2 Section "Shaping."

1. 8-foot (2.44 m) Wide Cart Path: Includes preparation, limestone base, prime and tack coats, joints, asphalt placement, asphalt finishing protection and curing. Excludes finish shaping.
2. 6-inch (150 mm) Curb: Includes preparation, joints, concrete placement, concrete finishing, and concrete protection and curing.
3. 8-foot Wide Maintenance Path: Including preparation, excavation, compaction, road-base gravel, and protection
4. Concrete Pad Practice Tee: Including preparation, edge forms and screed construction, joints, concrete placement, concrete finishing, concrete protection and curing.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed:

1. 8-foot (2.44 m) Wide Cart Path: Length of cart path installed, measured by measuring wheel.
2. 6-Inch (150 mm) Curb: Length of curb installed, measured by measuring wheel.
3. 8-foot Wide Maintenance Path: Length of Maintenance path installed, measured by measuring wheel.
4. Concrete Pad Practice Tee: Square feet installed, measured by measuring wheel.

1.5 DEFINITIONS

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

B. DOT: Department of Transportation.

C. Ready Mixed Concrete: Refer to ASTM C685 for definitions of terms.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed golf course cart path work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications.
1. Manufacturer shall be a paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located.

C. Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
1. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.

D. Source Limitations.
1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.

E. ACI Publications:

1. Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.
2. Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Preinstallation Conference: Conduct conference at Project site to comply with requirements in Divisiond 1 Section "Project Management and Coordination." Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
2. Review condition of subgrade and preparatory work.
3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

G. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate rolled curb, soft curb, typical joints, surface finish, texture, color, and standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Golf Course Architect.
2. Notify Golf Course Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Golf Course Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.

H. Demolish and remove approved mockups from the site when directed by Golf Course Architect.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
3. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
4. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or properly cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D 242, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO MP 1, PG 64-22.

B. Asphalt Cement: ASTM D 3381 for viscosity-graded material.

C. Prime Coat: ASTM D 2027, medium-curing cutback asphalt, MC-30 or MC-70.

D. Prime Coat: Asphalt emulsion prime complying with FDOT requirements.

E. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

F. Water: Potable.

G. Undersealing Asphalt: ASTM D 3141, pumping consistency.

H. Ready Mixed Concrete: ASTM C94 or ASTM C685

I. State Approved Concrete Sand

2.3 CONCRETE FORMS

1. Form Materials: Nominal 1" x 4" lumber, metal or other approved flexible materials to provide full depth, continuous, and curving or straight cart paths.

2.4 CONCRETE MATERIALS

A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.

B. Portland Cement: ASTM C 150, Type I or II.

C. Aggregate: ASTM C 33, uniformly graded, from a single source.

D. Water: ASTM C 94.

2.5 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.

B. Air-Entraining Admixture: ASTM C 260.

2.6 FIBER REINFORCEMENT

A. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

B. Products: Subject to compliance with requirements, provide one of the following:

1. Fibrillated Fibers:

a. Fibrasol F; Axim Concrete Technologies.
b. Fibermesh; Fibermesh, Div. of Synthetic Technologies.
c. Forta; Forta Corporation.
d. Grace Fibers; W. R. Grace & Co., Construction Products Div.

2.7 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

E. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

F. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

G. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.8 RELATED MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

B. Sand: ASTM D 1073, Grade Nos. 2 or 3.

C. Joint Sealant: ASTM D 3405, hot-applied, single-component, polymer-modified bituminous sealant.

D. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.9 ASPHALT MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types."
1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Provide mixes complying with composition, grading, and tolerance requirements in ASTM D 3515 for the following nominal, maximum aggregate sizes:
a. Base Course: 1 inch

b. Surface Course: 1/2 inch.

2.10 CONCRETE MIXES

A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

B. Proportion mixes to provide concrete with the following properties:

1. Compressive Strength (28 Days): 4000 psi (27.6 Mpa).
2. Maximum Water-Cementitious Materials Ratio: 0.40 to 0.50 according to manufacturer's recommendation for region. The lower end of the range is prescribed for severe exposure and the higher figure for mild exposure where concrete intended to have low permeability will not be exposed to freezing or deicing chemicals.
3. Slump Limit: 4 inches (100 mm)

C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.

D. In climates where cart paths are exposed to ice and freeze-thaw cycles, add air entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus or minus 1.5%:

1. Air Content: 5.5% for 1-1/2-inch (38 mm) maximum aggregate.
2. Air Content: 6.0% for 1-inch (25 mm) maximum aggregate.
3. Air Content: 6.0% for 3/4-inch (19 mm) maximum aggregate.

E. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd. (0.9 kg/cu. m).

PART 3 - EXECUTION

3.1 FINISH SHAPING

A. General: The location of cart paths indicated on drawings are approximate. Route cart paths as directed by Golf Course Architect.

1. Keep cart paths out of view from tees, landing areas and greens.
2. Maintain 30 feet to 40 feet (9.15 m to 12.20 m) between cart paths and tee locations, and 40 feet to 80 feet (12.20 m to 24.39 m) between cart paths and green locations.
3. Provide 10 foot (3.05 m) wide turn-outs with curb at each tee, green and inline drain.
4. Provide 10 foot (3.05 m) wide cart path with curb for the entire length of par 3 holes, for the practice area and in other locations as directed.

B. Establish final cart path subgrade 5 inches below finish grade with a maximum slope of 10% and a minimum slope of 1%. Do not exceed 5% cross pitch unless approved by Golf Course Architect.

C. Uniformly grade cart path subgrade to a smooth surface, free from irregular surface changes. Remove and dispose of tree roots, large rocks, debris and other deleterious material.

D. Compact cart path subgrade at (+/-) 2% of optimum moisture content to not less than 92% of maximum dry unit weight according to ASTM D 698.

PREPARATION

E. Proof-roll prepared subgrade surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

F. Remove loose material from compacted subgrade surface immediately before placing asphalt.

3.2 ASPHALT PLACEMENT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off.

B. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix.

C. Place each course to required grade, cross section, and thickness when compacted.

D. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.

E. Place hot-mix asphalt surface course in single lift.

F. Spread mix at minimum temperature of 250 deg F.

G. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

H. Complete a section of asphalt base course before placing asphalt surface course.

I. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

J. Place asphalt for entire width of cartpath to a depth of 0.5 inches.

1. Provide 8 foot wide cart path with curb for turnouts at greens and tees; on the downhill side of cart paths to intercept and direct storm water runoff to cart path inline drains; along the entire length of par 3 holes; and in other locations as directed by Golf Course Architect.

3.3 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections.

B. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.

2. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
3. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
4. Compact asphalt at joints to a density within 2 percent of specified course density.

3.4 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.5 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

3.6 EXTRUDED CONCRETE CURBING

A. General: Provide continuous extruded concrete curbing where indicated in field by Golf Course Architect. Pour extruded curbing on top of the sealed and prepared limestone base extending at

least three inches behind the curb. Material, curb form, and installation to be approved by the City Engineer and the Golf Course Architect.

1. Bond extruded curb to the prepared base course by using approved adhesive or a two-component epoxy; manufacturer's instructions must be followed.
2. Install control joints at nine-foot intervals and more often on radii, so as to minimize shrinkage cracking.
3. Coat finished curb with a curing compound, which has been designed to seal the surface and form a water proofing membrane.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.

B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.

b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.8 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow excavated materials to accumulate on-site.

3.9 MAINTENANCE PATH

A. Provide 8’ Maintenance path as directed by Golf Course Architect.

B. Establish final maintenance path subgrade at 4 inches below finish grade.

C. Compact subgrade at (+-) 2% of optimum moisture content to not less than 92% of maximum dry unit weight according to ASTM D 698.

D. Provide 4” compacted road base angular-material ASTM D 692, sound; angular crushed stone, crushed gravel

3.10 CONCRETE PRACTICE TEE PAD

A. Establish final practice pad subgrade at 4 inches below finish grade.

B. Match concrete specifications of 8 foot wide cart path without curb.

3.11 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation and inline drains to be embedded or cast in.

B. Remove snow, ice, or frost from subgrade surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subgrade to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around inline drains until they are at the required finish elevation and alignment.

D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery, at Project site, or during placement.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate by hand-spading. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.

H. Place concrete for entire width of cartpath to a depth of 4inches (100m), strike off and screed.

1. Provide 8 foot wide cart path without curb unless otherwise indicated.

I. Curbs: Provide 4 inch (100 mm) exposed monolithic curbs as indicated and to required lines, grades, finish, and jointing as specified for formed concrete.

J. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations.

K. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

L. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.12 CONCRETE FINISHING

M. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.

N. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface by hand floating to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium Textured Broom Finish: Provide a medium finish by striating float-finished concrete surface 1/16 (1.6 mm) deep with a stiff-bristled broom, perpendicular to line of traffic.

3.13 CONCRETE PROTECTION AND CURING

O. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.

P. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

Q. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

PART 4 - ALTERNATES

4.1 CONCRETE CART PATH

1. Concrete Cart Path - 8 Ft (2.4 m.) 4000 psi - fiber mesh concrete. Poured in place with wood forms (8' width @ 4" depth)

END OF SECTION 02751

SECTION 02810 – IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Irrigation Bid Documents prepared by Aqua Agronomic Solutions, Inc. dated February 28, 2014.

C. Irrigation Electrical Layout Plan dated 2/28/14 and Hydraulic Layout Plan dated 2/28/14.

1.2 SUMMARY

A. This Section includes:

1. Pump station(s), slab and footing. Primary power, building and meter-by Owner.
2. Central Controller, Grounding, Radio System w/base and antenna.
3. Irrigation Heads wiht Decoder Modules.
4. Testing.
5. Excavation and backfilling irrigation system work.
6. Associated plumbing and accessories to complete the system.
7. Wire sleeves (as required).

B. Related Sections include the following:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions.
2. Division 1 Section "Unit Prices" for a schedule of unit prices.

1.3 ALLOWANCES (N/A)

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Irrigation HDPE Pipe, Cable, and Copper Wire: install as outlined in Division 2 Section “Irrigation”.

2. Irrigation Valves, Surge Devices, Sprinklers, Quick Couplers, Central Control System, and Hand Held Remote: install as outlined in Division 2 Section “Irrigation”.

3. Quantities for Unit Prices found in Bid Form located in Irrigation Bid Documents prepared by Aqua Agronomic Solutions, Inc.

A. Measurement: Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed.

1. Irrigation HDPE Pipe, Cable, and Copper Wire: length of pipe installed, measured by wheel.

2. Irrigation Valves, Surge Devices, Sprinklers, Quick Couplers, Central Control System, and Hand Held Remote: each, measured by field count.

B. QUALITY ASSURANCE

C. Installer's qualifications: Minimum of 10 years of experience installing golf course irrigation systems of comparable size.

D. Materials, equipment, and methods of installation shall comply with, but not limited to, the following codes and standards:

1. All local and state laws and ordinances and with all the established codes applicable thereto.
2. American Society for Testing and Materials (ASTM).
3. National Sanitation Foundation (NSF).
4. American Society of Irrigation Consultants (ASIC).
5. The Irrigation Association (IA).

E. Excavating, backfilling and compacting operations: Comply with execution requirements and as specified in. **Section 4.0 of Installation Specifications** in AASI Bid Documents

F. Obtain Irrigation Consultant's acceptance of installed and tested irrigation system prior to installing backfill materials as specified in **Section 4.0 of Installation Specifications** in AASI Bid Documents.

G. Locations of all controllers, heads and other elements of the system are to be approved by Owner or Owner's Representative before wiring is installed.

1.5 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each of the system components.

B. Submit the following material samples:
1. Wire, wire connectors and sealer.

C. Submit the following equipment samples to Owner:
1. Valves and valve access boxes.
2. Controller

D. Approved equipment samples will be returned to Contractor and may be used in the work.

E. Upon irrigation system acceptance, submit written operating and maintenance instructions. Provide format and contents as directed by the Irrigation Consultant.

F. Provide irrigation system record drawings:
1. Refer to **Section 12.0 of Section 1 – Statement of Work and General Specifications** in AASI Bid Documents.

1.6 DELIVERY, STORAGE AND HANDLING OF MATERIALS & EQUIPMENT

A. Refer to 8.1 and 8.5 of Section 1 – Statement of Work and General Specifications in AASI Bid Documents.

1.7 PROJECT CONDITIONS

A. Take precautions to insure that equipment and vehicles do not disturb or damage existing site grading, walks, curbs, pavements, utilities, plants, and other existing items and elements on public and private property.

B. Irrigation system layout is diagrammatic. Exact locations of piping, valves, wire and other components shall be established by Irrigation Consultant in the field at time of installation, and approved by the Owner or the Owners Representative before installation.
   1. Minor adjustments in system layout will be permitted to clear existing fixed obstructions.

1.8 WARRANTY

A. Refer to **Section 13.0 of Section 1 – Statement of Work and General Specifications Installation Specifications** in AASI Bid Documents

PART 2 - PRODUCTS

2.1 MATERIALS

A. Refer to **Section 2 – Materials in AASI Bid Documents**.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine final grades and installation conditions. Do not start irrigation system work until unsatisfactory conditions are corrected and approved by Owner or Irrigation Consultant.

3.2 INSTALLATION

A. Refer to **Section 3 – Installation Specifications in AASI Bid Documents**.

3.3 ACCEPTANCE

A. Refer to **16.0 of Section 1 – Statement of Work and General Specifications in AASI Bid Documents**.

3.4 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from irrigation system installation.

END OF SECTION 02810

Aqua
Agronomic
Solutions, Inc.

Irrigation Analysis,
Mapping, Design

Irrigation System Bid Documents

Prepared For

Keney Park Golf Course
Hartford, Connecticut
February 28, 2014

Enclosed you will find specifications and bid proposals for the irrigation system.

The City of Hartford will accept proposals as specified in the Golf Course Architects bid package. The City of Hartford will open the bids as specified in the Golf Course Architects bid package. No bid can be withdrawn for a period of 60 days of the bid due date.

The installation of the irrigation system is to begin in the spring of 2014.

No bid clarifications will be accepted at the time of receiving bids. If clarification of any points in the bid documents is required, all clarifications issues shall be communicated as stated in the bid instructions from the City of Hartford.

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Irrigation System
Section 1

A. Statement of Work and General Specifications

1.0 Owner

1.1 The City of Hartford is the sole owner The Keney Park Golf Course.

1.2 The Irrigation Consultant is Aqua Agronomic Solutions, Inc.

1.3 The Golf Course Architect is Dusenberry Design Golf Course Design.

2.0 Intent

2.1 It is the intent of the City of Hartford to enter into contract with the bidder submitting the lowest responsible bid for the supply and installation of an automatic sprinkler system as described in these specifications for Keney Park Golf Course.

2.2 The contractor shall supply all material, labor, and supervision to construct the irrigation system as specified. The contractor's price shall include all expenses for material, shipping, duties, labor, travel, and mobilization to install a completely operational automatic irrigation system for Keney Park as described in these specifications.

2.3 All materials to be incorporated in this system shall be new and without defects. No material shall be moved from another job site to be installed at this site. The materials shall be as specified. No alternates shall be accepted.

3.0 Scope

3.1 The irrigation system shown on these plans and described within these specifications represents the supply and installation of the golf course irrigation system and the installation of a new pump station for this new golf course.

4.0 Laws and Regulations

4.1 All local, municipal, and state laws, rules and regulations relating to any portion of this work within this contract shall be carried out by the contractor.

4.2 If the contractor finds any conflict between these specifications and any laws, rules or regulations, the contractor shall follow whichever standard is more stringent. If a change of design is necessary, please notify the Irrigation Consultant immediately.

4.3 The owner shall be responsible for obtaining permits related to environmental and building permits. The owner shall pay for any fees or expenses related to these permits. The contractor is responsible for any permits to relating to doing business in the State or Municipality including the installation of the irrigation system.

5.0 Errors and Omissions

5.1 Bidders shall take no advantage of any apparent error or omission in these plans or specifications. In the event that a bidder discovers any error or omission in these documents, he shall immediately notify the irrigation consultant.

6.0 Indemnification and Hold Harmless Agreement

6.1 The contractor agrees to indemnify, defend and save harmless the owner and its consultants, agents, and employees from and against all loss or expense (including cost and attorney's fees) by reason of liability imposed by law upon the owner and it's consultants, agents, and employees for damages because of bodily injury, including death, at any time resulting there from, sustained by any person, or on account of damage to property, including loss of use thereof, arising out of or in consequence of the performance of this work, whether such injuries to persons or damage of property is due, or claimed to be due, to the negligence of the owner, the golf course designer, the engineer, the irrigation consultant, their agents, and employees; and he shall further defend, indemnify and save harmless the Owner, Designer, Engineer, Golf Course Architect, Irrigation Consultant, and their agents and employees from all suits and actions of any kind or character whatsoever which may be brought or instituted by any contractor, sub-contractor, or laborer who has performed work or supplied materials to or for the contractor or by, or on account of, any claims or amount recovered for an infringement of patent, trademark, or copyright.

7.0 Specifications and Drawing Compatibility

7.1 These specification and design drawings are intended to co-operate so that any condition or item specified by one but not appearing or specified by the other shall be of the same effect as if specified by both and shall be supplied, performed, and included in

the bid price.

7.2 The contractor shall be responsible for estimating and supplying all quantities of materials. The irrigation Consultant has estimated the quantities and presented these quantities in the bid documents. The bids shall be based on these quantities unless a request is made by the contractor to increase quantities after he has performed his material take off and before the bids are due.

Although the first bid sheet shows a lump sum price, this project is being bid as a unit price job. The contractor will be paid for the units installed on the project.

Where clarification or additional information is required, a request should be made in writing to the irrigation consultant. No extra compensation or charge will be allowed to the contractor unless there is a change in the scope or dimension of the project that will result in the need for additional material, equipment or labor.

8.0 Conduct of the Work

8.1 The contractor shall have access to the site for the purpose of performing the requirements of this contract under the direction of the Owner and his representative. The contractor shall be allowed to store equipment, supplies, and materials necessary to perform the requirements of the contract on the grounds in an approved area designated by the project manager. The contractor shall get the owner's approval before receiving any materials or equipment to the site. The approved area shall provide portable toilets to service the number of his employees on site and they shall be serviced as required by the leaser. The contractor shall also provide enough dumpsters to keep the approved area clean. Filled dumpsters shall be serviced promptly and shall be removed and replaced with empty dumpsters.

8.2 The contractor shall have at all times a foreman, satisfactory to the owner, which can act on behalf of the contractor on all matters pertaining to the work. The foreman shall represent the contractor and all directions given to him shall be the same as if given to the contractor. The foreman shall be assigned for the duration of this project.

8.3 The contractor shall give efficient supervision to the work, using his best skill and attention and shall supply enough equipment and manpower to finish the scope of the work in a timely manner as outlined in the contract documents. This shall include providing the labor, forklifts and other equipment required to properly and safely

unload all materials brought on site.

8.4 The contractor shall co-ordinate his work with other trades.

8.5 The contractor shall confine his operations to areas allotted to him by the owner. This also applies to areas for equipment and material storage. The contractor is responsible for off-loading of materials as they arrive on site. Adequate security of the materials on site is the responsibility of the contractor and shall be at his expense. During the life of the contract, the contractor shall be solely responsible for the replacement of any irrigation materials or supplies which are stored on the site and are stolen or vandalized. The contractor shall also be responsible for insurance on materials on site and installed until the system is turned over and accepted by the owner. The contractor shall furnish the Owner with a copy of the insurance certificate for the material.

8.6 The Owner shall determine all access and travel paths to the work area. Should the contractor cause damage by equipment moving outside of these areas, the contractor shall pay for the restoration at his expense.

8.7 The contractor shall use only competent personnel that will complete work of the highest quality. The contractor shall not employ disorderly, unreliable, or incompetent persons. Any foreman, workman or sub-contractor who refuses to comply with all reasonable directions of the owner, their agents or consultants in the matter of personal conduct on the part of such employee shall, at the request of the Owner, be removed from the site by the contractor.

9.0 Inspection

9.1 The owner, architect, engineer or irrigation consultant and any of their agents or employees shall have the right to inspect the materials or work at any time.

10. Insurance

10.1 The contractor shall maintain a minimum of two million dollars ($2,000,000.00) of insurance in full force and effect during the terms of this contract. This shall include but not be limited to Workman's Compensation, Public Liability, Property Damage and Automobile. The contractor shall furnish the owner with a certificate of insurance and shall advise the owner of any change in the status of said insurance. The contractor shall instruct the insurer to provide the owner with details of the coverage and a

written statement that the insurer will notify the owner of any lapse in coverage. The certificate shall state that the insurer cannot cancel the insurance in less than seven days after the insured and the owner have received written notification by certified mail of the intended cancellation.

11.0 Staking

11.1 The Irrigation Consultant has been retained to stake the irrigation system. A schedule for staking will be developed with the irrigation contractor. The contractor is to provide three (3) personnel to assist with the staking operation as well as eight (8) different color flags, and two 300' tape measures. One of the individuals assisting in the staking operation shall be the irrigation foreman for the contractor. The irrigation consultant will stake the golf course once. It is the contractor responsibility to maintain the flagging on the staked areas. No cell phones are allowed during staking.

12.0 Record Drawing

12.1 The Irrigation Consultant is responsible for providing the club with a GPS record drawing in New York State Plane. It is the responsibility of the irrigation contractor to maintain accurate written field notes of where the irrigation system has been installed. The record drawings shall be produced through the use of sub-meter accuracy Global Positioning System equipment and AutoCAD and shall be supplied digitally to the Keney Park before final approval and release of the final retainer.

12.2 It is the responsibility of the irrigation contractor to maintain accurate written field notes of where the irrigation system has been installed and supply these notes to the consultant G.P.S. Technician at the time of G.P.S. mapping. The contractor is also responsible to supply a qualified person to assist the technician with field location of the irrigation system during the data collection phase. The record drawings shall be produced through the use of Trimble XH G.P.S. equipment and AutoCAD and supplied to the course digitally.

12.3 The contractor is responsible for supplying as staked data recorded through the use of Trimble XH G.P.S. equipment to the irrigation consultant within one week of the staking.

12.4 The collection of data shall include all components of the irrigation system including sprinklers, valves, quick couplers, valves, and pipe, all change of direction fittings, wire and splices. The record drawing shall also include all components of the golf course

including greens, tees, fairways, bunkers, cart paths, and all grassing lines, trees, shrubs, and landscape beds.

13.0 Warranty

13.1 The contractor shall guarantee/warranty the irrigation system for a period of one year from final acceptance of the irrigation system by the Irrigation Consultant. This shall include all material, equipment, and workmanship against defects. It shall also include the filling and repair of depressions and restoration of landscape or structural features (including cart paths and drainage) caused by the settlement of irrigation trenches or excavations or any over tamping of soil. Any equipment manufacturer's warranty that extends beyond this one-year period shall be extended to The Keney Park as well.

14.0 Submission of Bid

14.1 All bids must be submitted on the forms provided.

14.2 The bid documents must be filled out by typewriter or in ink.

14.3 The project shall be based on a unit price bid. The unit prices shall be used for both additions and deletions. The base bid shall be based on the units given by the irrigation consultant multiplied by the unit prices. All of the extended price shall add up to the lump sum base bid.

The irrigation system bid documents should be submitted according to the schedule in the Golf Course Architects bid documents. A copy of the bid shall be emailed to Mr. Paul Granger.

14.4 Bidders must hold their bid prices for 60 days. The award of the contract will be within this time.

15.0 Contract and Payment

15.1 The City of Hartford and the Contractor shall agree to the use of an AIA form 101 contract with an AIA form 201 supplemental conditions contract.

15.2 Payment terms shall be negotiated with the contractor chosen by The City of Hartford.

15.3 Progress payments will be made monthly based upon the completed portion of the irrigation system. The project is a unit

price contract and a spreadsheet shall be setup showing as designed and as installed quantities separated by materials and labor on a monthly and project basis.

The progress payments shall be submitted on AIA Form G702 and G703 and shall be accompanied by the updated monthly spreadsheet and the individual hole field notes for the progress payments being submitted. An original shall be sent to the Club and to the Irrigation consultant along with the copies of the field notes. No payments will be made without the submission of field notes.

Change orders shall be submitted on AIA Form 701 and shall be submitted and signed before performing the work. No work conducted before submission of the change order will be approved for payment

15.4 A retainer of 10% of the labor will be held from each invoice submitted by the contractor.

Materials will be paid for as they arrive on site during the monthly billing. No retainer shall be withheld for materials.

15.5 Retainer will be released to the contractor within 30 days of final approval of the system.

16.0 Substantial Completion and Punch List

16.1 The Contractor agrees to start installation at an agreed upon time with The City of Hartford. The contractor shall achieve substantial completion by the time specified by The Golf Course Architect. Substantial completion is defined as all piping, sprinkler heads, valves, controllers and pump station are to be installed, wired, and operational and the first punch list completed.

16.2 The Contractor shall test the entire system and make sure that all air and dirt has been bled from system. The Contractor shall adjust system to meet the requirements of the bid documents and drawings. This work shall include but not be limited to the programming of the controller, adjustment of all part circle sprinklers, adjustment of pressure regulation on solenoid and control valves, and the leveling of all heads and valve boxes along with the leveling of any depressed or overfilled trenches.

16.3 Upon completion of testing and adjustment and the completion of clean up, the contractor shall request from the Irrigation Consultant a schedule for final inspection. The Irrigation Consultant will

arrange with all parties a time acceptable to all for the final walkthrough of the irrigation system. After this inspection, the Irrigation Consultant will provide a final punch-list of task that must be performed by the Contractor to gain final completion of the system.

16.4 A letter of final acceptance shall be drafted by the irrigation consultant. The date of this letter shall be deemed the date of final acceptance and shall be signed by the contractor, owner's representative, and the irrigation consultant.

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IRRIGATION SYSTEM
SECTION 2

B. MATERIALS

0.0 General

0.1 All material shall be new and unused and of the highest quality available. These materials must be without flaws or defects.

1.0 Pipe

1.1 All piping 2" (63mm) diameter pipe through 18" (450mm) diameter pipe shall be IPS HDPE DR 13.5 manufactured from a PE 4710 resin listed with the Plastic Pipe Institute in TR4. In addition, the resin shall be certified in writing to substantiate ductile performance and stress regression curve linearity to the 100 year intercept. The resin material shall meet the specifications of ASTM D3350-09 with a minimum cell classification of PE 445474C. Pipe shall be manufactured to the dimensions and requirements of ASTM F714 or ASTM D3035. Pipe shall be DR 13.5 unless otherwise specified on the plans. The pipe resin must be bimodal. The pipe shall contain no recycled compounds except that generated in the manufacturers own plant from resin of the same specification from the same raw material. 2" (63 mm) – 18" (450mm) piping shall be fusion welded HDPE piping as manufactured by Dura Line, Flying W or approved equal. The pipe must provide a written 25 limited warranty.

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1.2 All piping used to cross bridges or wetlands or for boring shall be IPS HDPE DR 13.5 manufactured from a PE 4710 resin listed with the Plastic Pipe Institute in TR4. In addition, the resin shall be certified in writing to substantiate ductile performance and stress regression curve linearity to the 100 year intercept. The resin material shall meet the specifications of ASTM D3350-09 with a minimum cell classification of PE 445474C. Pipe shall be manufactured to the dimensions and requirements of ASTM F714 or ASTM D3035. Pipe shall be DR 13.5 unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturers own plant from resin of the same specification from the same raw material. 2" (63 mm) – 18" (450mm) piping shall be fusion welded HDPE piping as manufactured by Dura Line, Flying W or approved equal. The pipe must provide a written 25 limited warranty.

1. 3 All piping used for wire conduit shall be grey colored PVC electrical conduit.

1.4 HDPE pipe shall be used for all road and driveway crossings with a span of 15 feet (5 m) or greater and shall extend a minimum of 20 feet (6 m) past the pavement.

2.0 Pipe Fittings

2.1 Fittings for HDPE piping 1.5" - 20" shall be PE4710 HDPE, Cell Classification of PE 445474C as determined by ASTM D3350-09. Butt Fusion and molded fittings shall have a manufacturing standard of ASTM D3261 and shall be molded such that knit lines are not present in the vicinity of the crotches of Tee and Elbow fittings. Fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans. Fabricated fittings per AWWA C906 are to be manufactured using a data logger. Reference to the data logger quality control records should be referenced from an indented stamp in each fusion bead of each fitting. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be a part of the quality control records. Fittings shall be supplied by Integrity Fusion or Harco.

2.2 Flanged and Mechanical Joint Adapters shall be PE 4710 HDPE, Cell Classification of 445474C as determined by ASTM D3350-09. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.

2.3 Mechanical taps on 2" (63mm), 3" (90mm) pipe for sprinkler connections shall be made using HARCO Electro fusion Saddles with 1½" female acme thread outlet, drilling the hole after installing the saddle. The branch shall provide full 1 ½" flow. Electro fusion x FACME saddles shall be DR11 per ASTM F1055. Saddle branch outlet adapters shall be 316 SS.

3.0 Swing Joints

3.1 Swing Joints for all sprinklers shall be the same size or larger than the inlet of the head. Swing joints shall be factory assembled and shall use o-ring seals as manufactured by Lasco only. The minimum length of the lay nipple shall be 12" (25 mm). The swing joint shall have Acme threads at both ends of the assembly. The swing joint shall be installed so that there is a 30 to 60 degree rise above the horizontal plane and the head is flush with the surrounding terrain.

3.2 Swing joints for quick coupling valves shall Lasco G13S-218 swing joints with male brass stabilizer elbow and snap-lok stabilizer only.

4.0 Isolation Valves

4.1 All mainline isolation valves 3” (75mm) –12” (100mm) shall be cast iron, epoxy coated, mechanical joint, resilient wedge with non-rising stem valves conforming to AWWA C-515. The exterior and interior of all ductile iron parts shall be coated with 14-16 mil fusion bonded epoxy that exceeds AWWA C-550 standard. The mainline isolation valves shall be rated for 250 psi and shall have a 2” operating nut. All Mainline gate valves shall have mechanical joints and shall be manufactured by NIBCO.

4.2 All green, tee and lateral isolation valves shall have electro-fusion and butt fusion connections. Green, tee, and lateral isolation valves shall be 2” - 4” and shall be polyethylene ball valves with DR 9 bodies (rated 250 psi) and DR 13.5 ends (rated 200 psi) per the requirements of ASTM D 3261. The valves shall be approved for water contact and NSF 61 listed. The valves shall be manufactured using Dow DGDA 2490 Black PE 4710 resin. The valves shall be full port and shall have a 2” operating nut. All seals shall be EPDM, nitrile seals are not permitted. Stems shall be modified phenylene oxide, acetyl stems are not permitted. Ball lubricant shall be optimized for water applications; valves also used in gas applications are not permitted. Connection of nut to stem shall not require the use of steel pins. The valve shall be the Poly-Water Valve for potable water as manufactured by Polyvalve - Andronaco Industries (Harco) or Integrity Fusion. Mainline to sub-main or lateral line(s) shall be made with Integrity Fusion or Harco IPS electro-fusion branch saddles and Integrity Fusion or Harco electro-fusion 90’s.

4.3 Isolation valves for air release valves shall be full port, polyethylene ball valves meeting the requirements in paragraph “4.2” immediately above. The valve shall be the Poly-Water Valve for potable water as manufactured by Polyvalve-Andronaco Industries (Harco) or Integrity Fusion

4.4 Ten of the appropriate configuration and size valve keys shall be supplied for each type of valve used on the project

5.0 Valve Boxes

5.1 All resilient wedge type gate valves used for isolation shall be housed in their own 10” circular valve box. The valve box shall be as manufactured by Highline Products and shall have green valve box. If required, extensions shall be supplied to raise the box to ground level.

5.2 All 2” and 3” lateral isolation valves for fairways shall be housed in a Water Curb Service valve box. The valve box shall be as manufactured by Highline Products and shall have green valve box covers.

5.3 All isolation valves shall have either a 4” sleeve for lateral valves or a 6” sleeve for mainline valves around the operating nut or handle. This sleeve shall extend to within 3” of the top of the valve box.

5.4 Air release valves shall be housed in a jumbo box with two 6” extensions. The valve box shall be as manufactured by Highline Products and shall have green valve box cover.

5.5 All splices shall be housed in a 10” round valve box. The valve box shall be as manufactured by Highline Products and shall have a black cover.

5.6 Valve covers for quick couplers shall be housed in a Deluxe Econo valve box. The valve box shall be as manufactured by Highline Products and shall have green valve box covers.

5.7 All solenoid valves and their accompanying isolation valves shall be housed in a 12” rectangular valve box. The valve box shall be as manufactured by Highline Products and shall have Valve box covers with custom color as specifically manufactured for The Keney Park. Valve boxes shall be as manufactured by Carson Brooks.

6.0 Sprinklers

6.1 Full circle fairway, rough, tee and green sprinklers shall be either Toro 835 sprinklers with integrated GDC decoder or Rain Bird 751 IC sprinklers as specified on the plan.

6.2 Part circle fairway, rough, tee and green sprinklers shall be either 835 sprinklers for GDC system or Rain Bird 751 IC sprinklers as specified on plan.

6.3 Fully adjustable sprinklers small spacing sprinklers shall be either Toro T70 series or Rain Bird 351 as specified on the plan.

6.4 All valve in head sprinklers shall have acme thread.

6.5 Furnish and install, where shown on the drawings and/or where directed, Rain Bird Integrated Control Module “ICM” controlled Rain Bird EAGLE™ valve-in-head rotors or electric valves. ICM control

modules shall be solid-state electronic circuitry and epoxy potted in a sturdy plastic case suitable for direct burial. Each ICM shall be located directly on the solenoid mounting threads of the valve-in-head golf rotor or electric valve. Each ICM module shall be factory set with an address and bar code permanently and prominently marked on the ICM case. A removable bar code label shall be attached to the permanent label to facilitate easy recording of ICM addresses. The ICM unit shall have individual wire leads of 24 inches. ICM units shall be capable of two-way real time communication with the ICI and central computer on a sub-second communication basis. Data transfer between the ICM and Central control system shall include critical operational status, system diagnostics and voltage information at each unit. Each ICM shall incorporate internal multi-stage surge protection on each wire leg to include varisters, diodes and inductor trace management. These surge devices shall be rated for 20kV and 10 kA

6.6 Furnish and install, where shown on the drawings and/or where directed, Toro GDC Decoders. Decoder control modules shall be solid-state electronic circuitry and epoxy potted in a sturdy plastic case suitable for direct burial. Each GDC Decoder Module shall be integrated into the sprinkler heads. Each GDC Decoder Module shall be factory set with an address.

7.0 Central Controls

7.1 The central control system shall be run through the use of a Premium Grade computer capable of running Toro Lynx for GDC or Rain Bird IC System for Cirrus.

7.2 The central controller computer shall also be supplied with a minimum 20” LCD 1080P monitor and Hewlett Packard LaserJet color printer Model 2600. All mounting brackets, communication and power cables necessary for the working of this system shall be included.

7.3 The central computer must be supplied by the manufacturer of the central irrigation software and must include a minimum of five-year support from the manufacturer. This service shall be either the Toro NSN Program or Rain Bird GSP Program, and should be supplied to the club with no additional charge

7.4 All communication from the central control system to the Decoders or ICM units shall be through the use of a two wire path.

7.5 The central control system shall be initially programmed by the manufacturer’s representative. The irrigation consultant shall

produce an image to be used for Toro Lynx or Rain Bird IC System for Cirrus. The Irrigation Consultant shall link the stations to the database program. After the irrigation consultant has loaded the programming into the central computer, the manufacturer's representative shall provide a minimum of two days on site training of operation of the control system. The manufacturer shall also provide access and travel to a factory conducted class for two individuals at the manufacturer's expense.

7.6 The Hand Held System remote shall be either a Toro Hand Held Remote or Rain Bird Freedom and shall include the site survey, licensing fees, all base radios and antennae required along with four (4) Motorola Model # PR 400 hand held radios supplied with DTMF pads.

7.7 A weather station shall be supplied with the central control system. They shall be compatible with the central control system weather software and shall be similar to the Rain bird WS-Pro or Toro Weather Station and shall communicate by radio.

8.0 Rainbird Controls

8.1 The central control system field components shall be the Rain Bird Integrated Control System "IC". The central control package shall be supplied with an Integrated Control Interface "ICI" as specified below to provide communication between the central control software and the field components. The field components shall be Integrated Control Modules "ICM" as specified below and mounted directly on the Rain Bird Golf valve-in-head sprinklers or electric valves. There shall be no field satellites or interfaces visible on the golf course. The overall system capacity for the IC System shall be determined by the level of central control software used in conjunction with the appropriate IC Interface.

8.2 The maximum length of run and wire gauge size of the two-wire path shall be installed according to these specifications and following the IC System design manual. At no time shall the maximum length of run of a wire path exceed the recommended design guidelines.

The central control software shall be version 7.0 or higher and incorporate advanced diagnostics to facilitate troubleshooting of field issues. The diagnostics shall be able to monitor field voltage at each ICM and perform a variety of tests to verify individual station operation.

8.3 The interface shall be a Rain Bird Integrated Control Interface “ICI” unit with solid-state electronic circuitry. It shall provide the necessary interface between the computer and the Integrated Control Module “ICM” units. The interface unit shall provide both communication from the computer out to the ICM units and receive “feedback” communication from the ICM units back to the computer. The ICI unit shall contain an internal transformer that reduces the output voltage to 24VAC, a CPU board and a maximum of two (2) driver boards. The ICI unit shall be capable of controlling up to 750 sprinklers or electric valves on each wire path, with one (1) ICM per valve-in-head golf sprinkler or electric valve. The ICI shall be sized as specified on the drawings.

8.4 The ICI-3000 unit will come standard with two driver boards, each having the ability to control two individual MAXI cable wire paths and up to 1500 ICM units. The ICI-3000 shall have a maximum capability to control 3000 ICM units on four (4) wire paths, when used in conjunction with the appropriate central control software.

8.5 The ICI unit shall be supplied complete with heavy-duty locking plastic cabinet, a 117VAC (100 VAC Japan, 230 VAC International or as required by local code) power supply cord, a five (5) foot long USB cable which shall connect the ICI unit to the central control computer, installation manual, mounting template and keys. The ICI unit shall have an external indicator light that will enable the user to observe ICI power supply and output performance without having to open the cabinet door. The CPU Board shall include an indicator LED to monitor communication with the central control software. Each Driver Board shall include two (2) LED’s for each wire path to monitor communication with central communication via “Data LED” and output wire path performance with via “Output LED.” ICI output voltage for each two-wire path shall be less than 30 VAC as measured at the output terminals on the Driver Board.

8.6 The ICI unit shall be installed in an indoor location and mounted on an interior wall with adequate service clearance and proper ventilation. ICI installation instructions, as provided in the manual supplied with the unit, shall be followed to ensure proper installation. All local codes must be followed during the installation of the ICI unit. The ICI unit shall be mounted within five (5) feet of the central control computer to facilitate use of the supplied USB cable. If located further away from the computer, a separate USB cable, up to 25 feet in length (not included with the ICI) may be used to connect the ICI unit to the computer.

9.0 Toro Controls

9.1 The central control system field components shall be the Toro GDC controls. The central control package shall be supplied with the appropriate number of Gateways to provide communication between the central control software and the field components. The field components shall be Toro GDC Decoder Modules integrated into the sprinkler heads. There shall be no field satellites or interfaces visible on the golf course. The overall system capacity for the GDC System shall be determined by the level of central control software used in conjunction with the appropriate Gateways.

9.2 The maximum length of run and wire gauge size of the two-wire path shall be installed according to these specifications and following the Toro GDC Product Guide. At no time shall the maximum length of run of a wire path exceed the recommended design guidelines.

9.3 The interface shall be a Toro GDC Gateway unit with solid-state electronic circuitry. It shall provide the necessary interface between the computer and the Tor GDC Decoder Modules. The interface unit shall provide both communication from the computer out to the Decoder units and receive “feedback” communication from the Decoder units back to the computer. The Toro GDC Gateways shall be capable of controlling the number of modules described in the Toro GDC Product Guide and shall be as specified on the drawings.

9.4 The GDC Gateway unit shall be installed in an indoor location and mounted on an interior wall with adequate service clearance and proper ventilation. Gateway installation instructions, as provided in the Toro GDC Product Guide, shall be followed to ensure proper installation. All local codes must be followed during the installation of the Gateway unit.

10.0 Wires and Cables

10.1 Wires connecting the remote decoders to the irrigation central shall be two conductors, type Polyethylene. Its construction incorporates two solid copper conductor and polyethylene insulation. The wires shall be UL® listed for direct burial in irrigation systems and be rated at a minimum of 600 VAC. Paige Electric Co., LP specification number P7350D –Rev (http://www.paigewire.com/specs/P7350D.htm)

10.2 Wires connecting the remote decoders to the sprinklers shall be two conductors, type Polyethylene. Its construction incorporates

two solid copper conductor and polyethylene insulation. The wires shall be UL® listed for direct burial in irrigation systems and be rated at a minimum of 600 VAC. Paige Electric Co., LP specification number P7351D –Rev (http://www.paigewire.com/specs/P7351D.htm)

10.3 Wires connecting the remote ICM to the irrigation central shall be two conductors, type PVC. Its construction incorporates two solid copper conductor and polyvynil chloride(PVC) insulation. The wires shall be UL® listed for direct burial in irrigation systems and be rated at a minimum of 30 VAC. Paige Electric Co., LP specification number P7072D –Rev (http://www.paigewire.com/specs/P7072D.htm)

10.4 Paige Electric DCSD shall be installed where indicated so that certain sections of the cable can be substituted for troubleshooting purposes. These shall be indicated on the plan.

10.5 All electrical connections shall incorporate:

1. A solid mechanical connection of the copper conductors
2. Electrical insulation of the mechanical connection
3. A means to waterproof the insulated connection
4. "Strain relief" to prevent the connection from coming apart when wires/cables are pulled-upon.

Approved products are as follows:

Product	Mechanical Connector	Insulation	Waterproofing Material	Strain relief
(For direct burial, as in "valve-in-head sprinkler" splices) 3M #DBY-6 (600 volts) 3M #DBR-6 (600 volts)	Wire nut with steel spring, included		Gel-filled plastic tube, included	Incorporated into lid of plastic tube

11.0 Quick Coupling and Solenoid Valves

11.1 Quick coupling valves shall be Toro Model 474-01 or Rainbird Model 5RCNP. A quantity of twelve (12) of the appropriate quick coupling valve key shall be supplied with the quick coupling valve. The quick coupling key shall be supplied with a ¾" hose swivel.

11.2 Master control valves shall be a pressure regulating, normally closed type having glass filled nylon and stainless steel construction. Master control valve shall be a Toro 220-27-XX series as indicated on the plans or Rainbird EFB-CP-PRS-D.

12.0 Air Release Valves

12.1 The air release valve shall be 1” and shall be as manufactured by Valmatic. They shall be Valmatic Model # 15A.3.

13.0 Grounding, Bonding and Shielding

13.1 EARTH GROUNDING

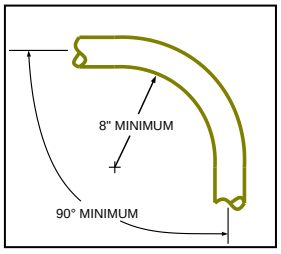
The Toro Gateway and Rain Bird ICI unit shall be properly grounded following recommended grounding procedures. The grounding grid shall consist of at least one 5/8” x 8’ copper clad, UL listed rod and one 4” x 96” x 0.125” grounding plate. The central ground grid shall have an earth ground resistance of 5 ohms or less. Individual wire paths shall have their own grounding at the central control grounding grid. Refer to the grounding specifications included with the central control package specifications for additional information.

Where shown on the drawings and/or where directed, install surge arrestors on the wire path. Ground wires from the surge device shall be attached directly to a 4” x 36” x 0.125” grounding plate, installed near the surge arrestor. One shall be furnished for every 15 units or every 500 feet (whichever is less) as well as at every trunk line dead end. The earth ground resistance shall be 30 ohms or less at each device.

It is the responsibility of the installer to connect all electronic irrigation equipment for which he is responsible to earth ground in accordance with Article 250 of the National Electrical Code® (NEC®.) Use grounding electrodes that are UL® listed or manufactured to meet the minimum requirements of Article 250 of the 2005 edition of the NEC®. The grounding circuit will include two solid copper ground plates and four 50-pound bags of PowerSet® earth contact material, as defined below and per the following detail. This detail is the minimum requirement for supplementary grounding of any electronic equipment. Other details, for a multitude of field situations, are available from the American Society of Irrigation Consultants, ASIC Guideline 100-2002 (www.asic.org, “Design Guides”.)

The copper grounding plate assemblies shall be 4” x 96” x 0.0625” [Paige Electric part number 182199L.] A 25-foot continuous length (no splices allowed unless using exothermic welding process) of 6 AWG solid bare copper wire is to be attached to the plate by the manufacturer using an approved welding process. This wire is to

be connected to the electronic equipment ground lug. If the equipment ground lug only accepts one wire, connect the second wire to the first with a brass split bolt, as close to the equipment lug as possible. The ground plates are to be installed to a minimum depth of 30", or below the frost line if it is lower than 30", at a location 8 feet and 10 feet from the electronic equipment.



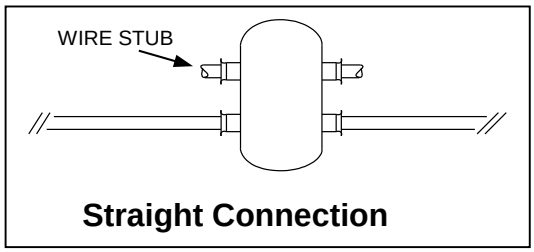
Two 50-pound bags of PowerSet® [Paige Electric part number 1820058] earth contact material must be spread so that it surrounds each of the copper plates evenly along its length within a 6" wide trench. Salts, fertilizers, bentonite clay, cement, coke, carbon, and other chemicals are not to be used to improve soil conductivity because these materials are corrosive and will cause the copper electrodes to erode and become less effective with time. Install all grounding circuit components in straight lines. When necessary to make bends, make sweeping turns, as shown. When connecting bare copper wire to the ground lug of electronic equipment, it must be fed through a dedicated 1.5" plastic sweep ell.

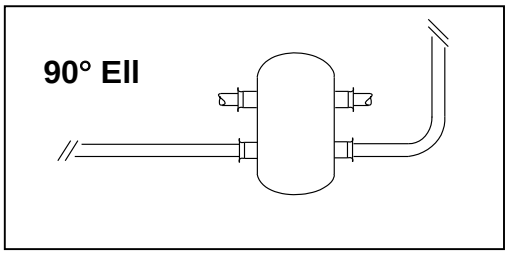
The earth-to-ground resistance of this circuit is to be measured using a Megger®, or other similar instrument, and the reading is to be no more than 30 ohms. If the resistance is more than 450 ohms, additional ground plates and PowerSet® are to be installed using ASIC Guidelines 100-2002 (www.asic.org, "Design Guides".) A written summary of the ground ohm readings shall be faxed and mailed to the consultant. No wires are to be connected to the controllers until the consultant has approved the readings. It is suggested that the grounding fields be installed as soon as the controller locations have been decided upon. It is required that the soil surrounding copper electrodes within the sphere of influence be kept at a minimum moisture level of 15% at all times.

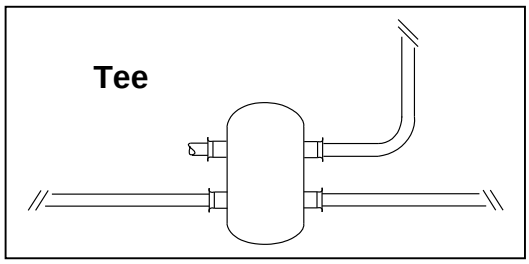
All underground circuit connections are to be made using an exothermic welding process by utilizing products such as the Cadweld-PLUS "One-Shot" kits. Solder shall not be allowed to make connections. In order to ensure proper ignition of the "One-Shot", the Cadweld battery powered Control Unit must be utilized [Paige Electric part number 1820040CU.] The 6 AWG bare copper wires are to be installed in as straight a line as possible, and if it is necessary to make a turn or a bend it shall be done in a sweeping curve with a minimum radius of 8" and a minimum included angle of 90°. Mechanical clamps shall be permitted temporarily during the resistance test process, but are to be replaced with Cadweld "One-Shot" kits immediately thereafter.

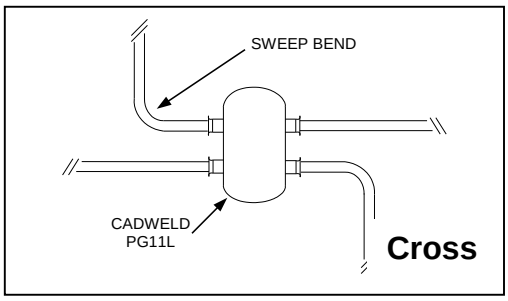
ALL GROUNDING COMPONENTS MUST BE CONNECTED TO THE EQUIPMENT BEFORE ANY OTHER CONNECTION IS
All splices to the bonding conductors shall be made using a Cadweld “One-Shot-PLUS” PG111L-PLUS kit as shown in the details below. [Paige Electric part number 1820074P.]

When joining bare copper wires, do so using an ERICO PG111L – PLUS "One-Shot" kit as shown in the details below. [Paige Electric part number 1820074P.]









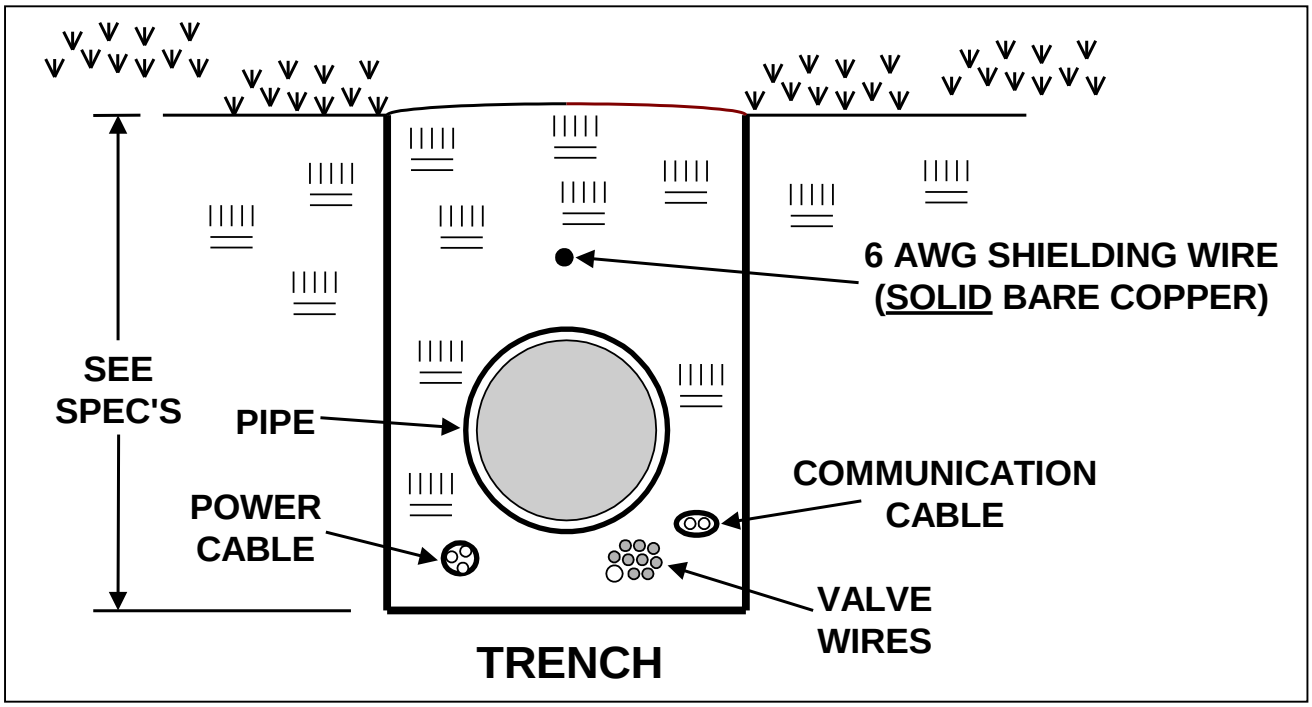
13.2 BONDING

The above grounding circuit is referred-to as “Supplementary Grounding" in the NEC®. And for safety reasons, the NEC® requires that all supplementary grounds be "bonded" to each other and to the service entrance ground (power source) as shown in the detail. This is also "recommended practice" of IEEE Standard 1100- 1999.

The bonding conductors are to be 6 AWG solid bare copper. All splices to the bonding conductors shall be made using a Cadweld “One-Shot-PLUS” PG111L-PLUS kit as shown in the details below. [Paige Electric part number 1820074P.]

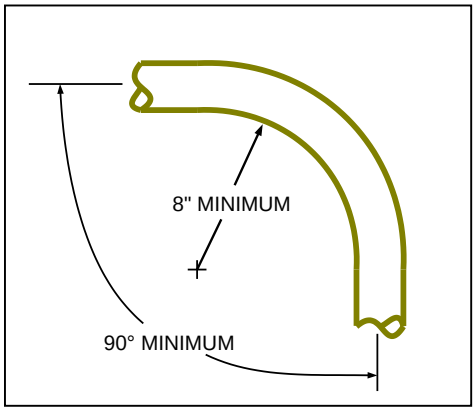
13.3 SHIELDING

The bonding conductors are to be installed in such a way so that they also act as shielding conductors. This becomes a network of solid bare copper wire over all the main bundles of other wires and cables as shown in the detail below.



The bare copper wire is to be installed as close to the surface as possible, yet being sufficiently below the ground level as to prevent damage from maintenance equipment such as aerators. And it must be placed above all other valve/power/communication wires and cables, per detail, and installed in all trenches as shown on the electrical plan drawings. It is not necessary to install this conductor over short wire runs (less than 150 feet) away from the main wire bundles. The conductor is laid in as straight a line as possible, and when necessary to make bends, do so in a sweeping motion using the following detail as a guideline.

Note: When connecting bare copper wires to the ground lug of electronic equipment, feed it through a dedicated 1 ½" plastic sweep ell to automatically meet the requirements of the "sweep bend" shown here.



The shield network is to be connected to the service entrance earth ground, to all electronic equipment ground lugs, and all equipment supplementary grounding electrodes. One such network is necessary for each power source.

14.0 Pump Station

14.1 To provide a single source responsibility for the manufacture, warranty, service and operation of a prefabricated, skid mounted, fully automatic variable speed pumping system (systems) for turf irrigation. The pumping system shall automatically maintain a constant discharge pressure regardless of varying flow demands within the station rating. Pumping system shall conform to the following specifications in all respects. This specification covers the minimum requirements; however, it should not be construed as all-inclusive. **The complete pumping station** shall be built in accordance with applicable standards for usage and safety and **shall display the UL label for safety**. The manufacturer shall supply a complete set of general arrangement drawings, electrical power schematics, and control schematics in the operations & service manual.

14.2 The pumping system shall be a three pump station capable of pumping 1000 gpm and boosting 30 psi incoming pressure to a discharge pressure of 120 psi and shall include a reduced pressure backflow preventer. The station will operate on 460 volt 3 phase power. The pumping system shall be of the type manufactured by **DAF Services, Inc.,** Windsor Locks, CT, U.S.A., or equal, approved by the purchaser prior to bid opening.

14.3 Pump station shall be a completely skid mounted horizontal centrifugal VFD pump station built by a single manufacturer. All equipment including but not limited to pumps, motors, valves, instrumentation and controls shall be mounted on a common structural steel base to form a complete operating pumping station. Main structural members shall be constructed from heavy weight channel or I-beam construction. Base shall include ¼" checkered deck plate and 1" steel plate mounted under the pump and motors. All deck plate must be seal welded. Skip welding is not permitted.

The control panel shall be dip cleaned, acid etched and neutralized, iron phosphate coated and painted with a finish coat of 1 1/2 to 2 mils of polyurethane.

14.4 All bolts used in the assembly of the pumping system shall be zinc plated to retard corrosion.

14.5 The main irrigation pump(s) shall be of the horizontal centrifugal type with flow and head defined above. The horizontal pumps shall be manufactured according to the standards of the Hydraulic Institute and to ANSI specification No. B58.1. The pump casing shall be ASTM 48, class 30, cast-iron capable of hydrostatic test @ 150% of maximum discharge pressure and have both suction and hub replaceable wear ring. All mating parts shall have a register fit to ensure alignment.

The impeller shall be an enclosed, single piece bronze or cast-iron casting completely machined on all outside surfaces and statically balanced at time of pump assembly. The impeller shall be keyed to the shaft and securely fastened with a vibration resistant lock screw and washer.

The packing box shall contain a **mechanical seal** for the specific application.

The impeller shall not contact the suction or hub wear ring under any operating load condition.

The pump and motor shall be connected by an ASTM 48, class 30, cast-iron bracket incorporating a full isolating shield with dual slinger rings to prevent moisture from entering the front motor bearing. The main irrigation pump shall be as manufactured by Gould.

14.6 Motor(s) for the main irrigation pump shall be of United States manufacture, close-coupled type with rodent screens on all ventilating passages and be open-drip proof, 1.15 service factor, and class F insulation. Design pump brake horsepower shall not exceed 98% of motor horsepower exclusive of service factor. Maximum pump run out horsepower shall not be greater than 8% higher than motor rating exclusive of service factor. The motor bearings shall be selected to withstand thrust loads and have a minimum life of 5 years continuous operation. The motor shaft shall be high-strength steel protected by a bronze shaft sleeve secured to the shaft to prevent rotation. Motors shall be as manufactured by U.S. Electric, or Baldor or Reliance.

14.7 Motor for pressure maintenance pump and feeder pump shall be a stainless steel submersible type with a 1.15 service factor. Pressure maintenance motor shall be as manufactured by Gould

and the motor for the feeder motor shall be as manufactured by Goulds or equal.

14.8 The pump station manufacturer shall provide on each horizontal pump motor a 120- volt, single-phase space heater of ample size to prevent condensation from occurring within the motor during non-operating periods. The space heater shall be de-energized when the motor is running.

14.9 Pump check valves shall be provided on the discharge of each pump and sized per the technical data sheet. They shall be of the silent operating type that begin to close as forward velocity diminishes and be fully closed at zero velocity preventing flow reversal. Valve bodies shall be cast from grade 35 cast-iron or better and shall be free from blow holes, sand holes, and other impurities. The valve design shall incorporate a center guided, spring loaded poppet, guided at opposite ends and having a short linear stroke that generates a flow area equal to the pipe diameter. Internals shall be machined bronze disc, seat, and stem guide. Seat shall be Buna-N to provide resilient sealing. Dual disc style check valves are not acceptable. Valves shall be sized to permit full pump capacity to discharge through them without exceeding a pressure drop of 2.5 PSI. Check valve shall be as manufactured by Valmatic or equal.

14.10 Pump Discharge isolation valves shall be of the butterfly type with grooved ends to provide for expansion and vibration dampening and a lever operator. Lug style isolation valves are not acceptable**.** They shall be sized as shown in the technical data sheet. Valve body shall be constructed of ductile iron with a polyphenylene sulfide coating. Valve disc is rubber coated ductile iron. Valve shall be rated to 300 PSI. Isolation valve shall be as manufactured by Stockham or equal.

14.11 Pump Suction isolation valves shall be installed on the inlet of the pump to completely isolate the individual pumps. Valve shall be of the lug style butterfly type. Valve shall have one piece body cast from ASTM A126 cast iron. Stem shall be 416 stainless steel. Disc shall be nickel-plated ductile iron. Stem bushings shall be Acetyl to prevent stem seizure to body during prolonged periods of non-use. Seat shall be Buna-N elastomer, one-piece construction, and shall also form the flange sealing gaskets. Valves 8" and smaller shall have a lever operator. Valves 10" and larger shall have a gear operator with hand wheel. Valve shall be rated at 200-PSI bubble shutoff. Pump suction isolation valve shall be as manufactured by Stockham.

14.12 A pilot operated modulating pressure relief valve shall be included . The valve shall be set 7 to 10 PSI above operating pressure and will relieve when inlet pressure exceeds spring setting on pilot. Valve shall be quick opening and slow closing to minimize surging. Valve body shall be cast iron with 125-lb. inlet and outlet flanges, and shall be rated for 200 PSI. A wye-strainer shall be installed in the inlet side of the valve body to provide clean water to the CRL pilot. A wafer style butterfly valve shall be installed on the inlet and outlet of the relief valve. Specifications for this isolation valve will be the same as for the station isolation valve found later in the specification. Relief valve shall be as manufactured by CLA-VAL.

14.13 A pressure gauge shall be mounted on the suction and discharge header with an isolation ball valve. All gauges shall be silicon filled to reduce wear due to vibration. Accuracy shall be within 2%. Gauge diameter shall be 3 1/2" minimum. Range shall be at least 30% higher than the highest pressure attainable from the pumps at shutoff head conditions. Stainless steel back & bronze internal. Pressure gauge shall be as manufactured by Wicka.

14.14 Station isolation valve shall be installed on the discharge of the pump station to completely isolate the pumping system from the irrigation system. Valve shall be of the lug style butterfly type. Valve shall have one piece body cast from ASTM A126 cast iron. Stem shall be 416 stainless steel. Disc shall be nickel-plated ductile iron. Stem bushings shall be Acetyl to prevent stem seizure to body during prolonged periods of non-use. Seat shall be Buna-N elastomer, one-piece construction, and shall also form the flange sealing gaskets. Valves 8" and smaller shall have a lever operator. Valves 10" and larger shall have a gear operator with hand wheel. Valve shall be rated at 200-PSI bubble shutoff. Station isolation valve shall be as manufactured by Stockham.

14.15 Controls shall be manufactured to provide complete instrumentation and controls to automatically start, stop and modulate pump speed(s) to smoothly, efficiently and reliably pump variable flow rates at a constant discharge pressure. Full alarms and safety features needed to protect the equipment and irrigation piping system are to be included. The control panel shall have a color Operator Interface mounted on the front of the panel.

14.16 During non-irrigation times, the pressure maintenance pump (PM) will cycle on and off as required to maintain irrigation system pressure. The start and stop pressure shall be a differential off of set-point. The cycling pressures can be user selected and can be set substantially below normal set point pressure, if desired. If the PM pump cannot maintain the desired pressure, then the VFD will

start the first pump and will gradually ramp the pressure up to desired irrigation pressure. The start pressure of the VFD pump shall be a differential below the set-point. The pump speed will be modulated to hold a constant discharge pressure regardless of flow. As the flow rate increases and the VFD pump can no longer maintain pressure while at maximum speed, the next sequential pump will be started and the VFD driven pump will accordingly reduce its speed and modulate. An algorithm shall be included for accurately reducing the VFD pump speed as the next sequential pump is started so that no pressure surges are generated during the transition (even with across the line starting). If the user prefers to switch the VFD from pump to pump for sequential starting, he can select this option with the OID. As the flow continues to increase, pumps will sequentially be started until all pumps are running. As the flow begins to decrease, pumps will be sequentially turned off until only a single VFD driven pump is operating. When a no flow condition occurs, the VFD pump shall be turned off.

14.17 Remote PC compatible pump station monitoring software shall be supplied by pump station manufacturer and shall be cloud based.

Manufacturer shall provide the capability to monitor and control the pump system from a remote location.

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C. Installation Specifications

1.0 General

It is the intent of these specifications to define the work of installing the irrigation system for The Keney Park Golf Course in strict accordance with the manufacturer's recommended procedures, standard industry practices and the plans, materials, and specifications, which upon completion, will operate in the manner that was intended in the development of these plans and specifications.

2.0 Underground Utilities

2.1 The contractor will arrange for and coordinate with the local authorities the location of all underground utilities. Contact the local One Call service prior to any excavation.

2.2 The contractor is responsible for any and all repairs of underground utilities during construction. The repairs shall be conducted at no additional cost to the owner.

3.0 Pipe Routing

3.1 Pipe routing shall be in accordance with the irrigation plans. The owner reserves the right to change the routing from that shown on the plans in cases where rock or other obstacles interfere with the intended depth or path. In no event shall these small changes affect the cost of the project.

3.2 Pipe at greens and tees shall be as shown on plans. It is the intent of these plans that the mainline pipe is to come no closer than twenty feet from the edge of the putting surface and a minimum of ten feet from the edge of the teeing surface. In no case shall pipe run on the green or tee surface or through bunkers.

3.3 No valve boxes shall be placed in the approach to the green, inside the tee surface or in a fairway. It is preferential that all valve boxes be on the side or rear of the green and tee complexes.

4.0 Excavation, Trenching, and Backfilling

4.1 During loading, transportation and unloading of pipe, every precaution shall be taken to prevent injury to the pipe. No pipe shall be dropped from cars or trucks, or allowed to roll down slides without proper retaining ropes. During transportation each pipe shall rest on suitable pads, strips, skids or blocks securely wedged or tied in place. Any pipe damaged shall be replaced.

4.2 Sections of HDPE shall be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe supplier's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe supplier, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and interfacial fusion pressure of 75 p.s.i. The fusion equipment shall be manufactured by McElroy Manufacturing or equal. The butt fusion joining shall produce a joint weld equal to or greater than the tensile strength of the pipe itself.

4.3 Electro fusion may be used where the butt fusion method cannot be used. Electro fusion couplings and fittings shall be PE 4710 HDPE, Cell Classification of PE 445474C as determined by ASTM D3350-09. Electro fusion couplings or fittings shall have a manufacturing standard of ASTM D3261. Couplings and fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.

4.4 Mechanical connection to other types of pipe shall be made by one of the following methods:
1. Flange, using HDPE flange adapter with ductile iron back up ring, and zinc-plated bolt pack.
2. Mechanical joint, using HDPE Mechanical Joint (MJ) adapter kit.
3. Bell MJ adapter with kit (4"- 12")

4.5 Prior to HDPE pipe being installed in the trench, at the beginning of the job, the contractor shall cut out the first butt fusion of each pipe size. The contractor shall prepare the sample for the test. The samples shall be tested in the presence of the owner's representative and / or the irrigation consultant. All samples shall be labeled and saved. Testing must be done at 73 degrees F plus or minus 5 degrees. The test temperature and sample size are critical to testing.

The purpose of the test is to determine if a good weld was made. A pass means no failures during the bend back test. This means a

good weld. A break means a bad weld. Any failure shall require additional testing.

4.6 Prior to HDPE pipe being installed in the trench, after the contractor has begun butt fusion of the pipe, the irrigation consultant and/or the owners representative reserve the right to select at random two butt fusion joints (with a minimum of 18" of pipe on each side of the joint). These samples shall be sent to the HDPE supplier for hydrostatic testing at the contractor's expense.

The testing procedure shall be to Factory Mutual Standards. In no case will the failure be in the butt fusion joint. The test will be recorded and sent to the contractor and irrigation consultant. Upon failure of any butt fusion weld; contractor may/will be required to cut and re-weld all questionable butt fusion joints as directed by the Irrigation Consultant.

4.7 Prior to HDPE pipe being installed in the trench, after the contractor has begun butt fusion of the pipe, the irrigation consultant and/or the owners representative reserve the right to select at random two butt fusion joints (with a minimum of 8" of pipe on each side of the joint). These samples shall be sent to the HDPE supplier for McSnapper testing at the contractor's expense.

Manufacturer will prepare and test pipe sample with a McSnapper Impact Tensile Test Unit. The test sample must be cut to the exact dimensions required for the McSnapper test. A good weld will provide a ductile failure. A bad weld will be indicated by a brittle failure usually in the weld. The test results will be recorded and sent to the contractor and irrigation consultant. Upon failure of any butt fusion weld; contractor may/will be required to cut and re-weld all questionable butt fusion joints as directed by the Irrigation Consultant

4.8 All main line pipe joints are to be butt fused using McElroy fusion equipment or equal. Each butt fusion unit shall be equipped with a data-logger. The contractor shall label each butt fused joint so as it will be recorded on the data-logger. The data-logger shall record temperature, fusion pressure, with a graphic representation of the fusion cycle and shall be part of the quality control records. The data-logger information shall be downloaded weekly and given to the irrigation consultant or owners representative for quality control records.

4.9 Pipe shall be installed in strict accordance with the manufacturers' recommendations. This should include the bedding of pipe in the bottom of the trench.

4.10 Excavate the trench to permit the pipe to be laid and to permit workspace for installing connections and fittings.

4.11 Minimum cover over pipe shall be as follows:

Mainline Pipe 4” and larger:	24”
Low Voltage Wiring:	18”
Lateral Line Piping:	18”
Sleeves:	36”

4.12 Mechanical trenchers and rock saws are to be used for all mainline and lateral trenches. Vibratory Plows are not to be used.

4.13 In general, excavated material should be satisfactory for backfilling. Backfill shall be free from rubbish, and stones over 4” in diameter. If material is unsuitable for backfill, remove material not suitable for backfilling and bed pipe with clean fill or topsoil from site or from offsite as negotiated with the club. In no case shall any rock with sharp edges be placed in the trench as backfill.

4.15 Backfilling shall be by hand placing fill under, around, and above pipe to a depth of 6”. This material should then be hand tamped. The remaining backfill may be machine filled. This material needs to be mechanically tamped to suitability.

4.16 The compacted trench shall be left flush with the existing grade after sod has been replaced.

4.17 Deleterious materials shall be dug and stockpiled on the side of the trench. The contractor shall supply any additional backfill as approved by the golf course superintendent.

4.18 If subsurface conditions along the proposed trench line are such that excavating equipment of the type and size correctly suited to this installation cannot properly excavate the trench, excavation shall be carried out by a hoe ram, rock wheel or other approved method. Only experienced personnel shall be used and protection shall be provided for all persons on the owner’s property. The contractor shall be responsible for any personal or property damage as a result of this work. The contractor shall remove and dispose of all excess and unsuitable backfilling material at an appropriate site worked out with the golf course superintendent on site.

5.0 Sleeves

5.1 Where installation of the irrigation system crosses a roadway, the contractor must obtain the appropriate permit required to make the crossing. All such crossings shall be sleeved in ductile iron or as required by local code

5.2 Sleeve piping shall be sized at two (2) times the diameter of the pipe to be carried within the sleeve and a minimum of 2" (50 mm) size. Only one pipe may be installed within each sleeve, pipe and wire shall not share the same sleeve.

5.3 Sleeve piping shall be sized at two (2) times the diameter of the wire bundle to be carried within the sleeve. A 3' (75mm) long expansion coil of the control wire shall be provided in a pull box at each end of the wire sleeve. The ends of the wire sleeves shall have the cut edges sanded smooth to prevent cutting of the control wire casing.

5.4 All sleeves shall run continuously between planted areas without directional changes of more than 15 degrees. The ends of all sleeves shall extend 24" (50mm) beyond either side of the pavement being crossed.

6.0 Pipes over Bridges, Wetlands, and Creeks

6.1 Pipe for wetland and creek crossings where permitted shall be DR 13.5 4710 HDPE. All manufacturers' recommendations shall be followed regarding installation.

6.2 Directional boring is to be used for all stream, creek and road crossings, DR 13.5 4710 HDPE piping is be used for all directional boring.

7.0 Valves and Valve Boxes

7.1 All valve boxes shall be installed so that the lid is flush with finish grade.

7.2 Each valve shall be housed individually in its own box. Valves should be set plumb to the pipeline and should have adequate clearance above for valve box cover to fit clearly.

7.3 Valve boxes shall have porous landscape fabric installed under the valve box, and gravel barrier, to prevent intrusion of soil into the box. Boxes shall utilize the provided holes and knock outs for the routing of pipe into and out of the box. No cutting of valve boxes shall be allowed.

8.0 Sprinkler Heads

8.1 All sprinkler heads must be installed on swing joints as shown on detail. Sprinkler heads shall be installed at above finished grade.

8.2 Sprinkler heads shall be spaced as indicated on the drawings and never farther apart than indicated on the plans. The design intent is to provide 100% head-to-head coverage of all irrigated areas.

8.3 Sprinkler heads shall be installed with the nozzles indicated on the plans and adjusted to provide coverage to the indicated areas.

9.0 Quick Coupling Valves

9.1 Quick coupling valves shall be installed as indicated on the irrigation plan. Installation shall be as shown on detail sheet.

9.2 Quick coupling valve shall have a 6" (150mm) PVC sleeve installed around it. This sleeve shall be covered with a valve box cover as specified at grade.

10.0 Control System

10.1 The central controller, along with the Hand Held Remote, shall be mounted in the superintendent's office in the Maintenance Facility.

10.2 Install and test central control components including the computer, central interface components, and any communication hardware as per the manufacturer's recommendations. Final wire connections are to be in conduit and performed by the manufacturer's representative.

10.3 The initial programming of the central control system shall be performed by the manufacturer's representative. The Irrigation consultant shall perform the image and data linking.

10.4 The contractor shall arrange with the equipment distributors Technical Services Department for assistance in the installation and site survey required for the handheld radio unit and central control system radio communication. It is the responsibility of the contractor and the distributor to acquire and pay for the licensing process.

10.5 The central programming interface shall be connected to an individual grounding network. The grounding network shall be in accordance with the specifications outlined in Section 2, 11.1 and

11.2.

11.0 Wiring

11.1 The cable path has been located for optimum performance. The contractor shall not deviate from the design as shown, unless he notifies the irrigation consultant.

11.2 Carefully backfill around wire to avoid damage to wire insulation.

11.3 All wire inside buildings shall be installed in electrical conduit.

11.4 All wires are to be spliced using products defined in the splicing section of these specifications and in accordance with the instructions from the manufacturer of the connectors/waterproof connector kits.

11.5 All wires crossing bridges, streams, or wetlands shall be in gray PVC electrical conduit.

12.0 Grounding

12.1 Follow the grounding instructions as set forth in Section 2, 13.1, 13.2, 13.3.

13.0 Pump Stations

13.1 The manufacturer shall be responsible for providing all materials and equipment necessary to install all items associated with the pump station including the crane.

13.4 When discharge piping and final electrical connections have been made to the pump station, the pump station manufacturer or their authorized representative shall set up, start, and calibrate the pump station to satisfy the demands of the irrigation system. The manufacturer or their authorized representative shall train the golf course personnel in the operation, maintenance, and adjustment of the pump station. One full day shall be dedicated to this process.

13.5 The manufacturer or their authorized representative shall operate the pump station across the entire range of the output without undue vibration. The pump station shall be tested for normal start and stop conditions under load. All defects shall be corrected and adjustments made at the expense of the manufacturer. Test shall continue to run until all results are satisfactory. The irrigation consultant shall be notified when start up will be performed.

IRRIGATION BID

Keney Park

Information should be included as part of the Keney Golf Course Renovation, Keney Golf Course Bid Submittal.

Lump Sum Bid: $_____

Acknowledgement of receipt of the following Addenda:

Addenda #1: _____ Dated: _____

Addenda #2: _____ Dated: _____

Addenda #3 _____ Dated: _____

The following items shall be used in reaching the above lump sum price for this project.

The prices below shall add up to the total lump sum bid for the project. Prices submitted shall include all labor, material, overhead, profit, preparation, installation and cleanup. The lump sum is based on unit prices and is only an estimate of the contract as we will be paying based upon the units installed.

All of the below unit prices for pipe, sprinklers, and quick couplers include all fittings, swing joints, etc. necessary for a fully installed and operating head. The unit prices for valves include fittings, and valve boxes as required.

	ITEM	EST. QUANTITY	UNIT PRICE	EXTENSION
1.	12“ DR 11 4710 HDPE	240‘	$_____	$_____
2.	10“ DR 11 4710 HDPE	280‘	$_____	$_____
3.	8“ DR 11 4710 HDPE	3400‘	$_____	$_____
4.	6“ DR 11 4710 HDPE	11500‘	$_____	$_____
5.	4“ DR 11 4710 HDPE	8500‘	$_____	$_____
6.	3“ DR 11 4710 HDPE	15500‘	$_____	$_____
7.	2“ DR 11 4710 HDPE	33000‘	$_____	$_____
8.	10” Mechanical Joint Gate Valve	1	$_____	$_____
9.	8” Mechanical Joint Gate Valve	4	$_____	$_____
10.	6” Mechanical Joint Gate Valve	16	$_____	$_____
11.	4” Mechanical Joint Gate Valve	11	$_____	$_____
12.	4” HDPE Ball Valve	20	$_____	$_____
13.	3” HDPE Ball Valve	59	$_____	$_____
14.	1” Air Release Valve	8	$_____	$_____

Rainbird

15. 1 ¼" 751 Part Circle/Full Circle VIH Sprinklers
694 $_____ $_____

16. Rain Bird ICSD Surge device
58 $_____ $_____

17. Paige 270DCSD
8 $_____ $_____

18. Paige 7072D #12 Maxi Cable
23,000' $_____ $_____

19. Paige 7072D #14 Maxi Cable
47,000' $_____ $_____

20. Grounding Equipment, Cadweld Connectors, and Ground Enhancement Material
1 $ Lump Sum $_____
Attach Detailed Take Off

21. Central Control System
1 $_____ $_____

22. Hand Held Remote 1 $_____ $_____

Toro

23. 1" 835 Part Circle/Full Circle VIH Sprinklers
694 $_____ $_____

24. Toro DEC-SG-LINE
58 $_____ $_____

25. Paige 270DCSD
8 $_____ $_____

26. Paige 7350D #12 Cable
23,000' $_____ $_____

27. Paige 7350D #14 Cable
47,000' $_____ $_____

28. Grounding Equipment, Cadweld Connectors, and Ground Enhancement Material
1 $ Lump Sum $_____
Attach Detailed Take Off

29.	Central Control System	1	$_____	$_____
30.	Hand Held Remote	1	$_____	$_____

Toro and Rain Bird

32.	Quick Coupling Valve	180	$_____	$_____
33.	#6 Solid Bare Copper Wire	25,000'	$_____	$_____
34.	Miscellaneous	1	$ Lump Sum	$_____
		Attach Detailed Take Off		
35.	Mobilization	1	$ Lump Sum	$_____
36.	Housing	1	$ Lump Sum	$_____
37.	Performance Bond	1	$ Lump Sum	$_____
37.	Performance Bond	1	$ Lump Sum	$_____
38.	Irrigation Consultant Field Services	1	$ Lump Sum	$__35,000.00____

BY: _____

Title: _____

Company: _____

Telephone: _____ Fax: _____

Date: _____

SECTION 02851 - TIMBER BRIDGES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes timber bridges.

B. Related Sections include the following:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions.
2. Division 1 Section "Unit Prices" for a schedule of unit prices.
3. Division 2 Section "Site Clearing" for tree protection, clearing, grubbing and disposal.

1.3 ALLOWANCES

A. NA.

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Timber Bridges: Includes pilings, decking, curbing, structural steel and miscellaneous metals, abutments, x-bracing, handrails and backfill.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed.

1. Timber Bridges: Length of bridge installed, measured by taping.

1.5 DESIGN REQUIREMENTS

A. Timber bridges shall be pile supported, low profile, freeform design, engineered for a minimum uniform live load of 100 pounds per square foot, or 10,000 lb. vehicle load, including impact loading.

B. Provide 10 feet (3.05 m) usable width with wear decking.

C. Do not exceed 10% slope.

1.6 SUBMITTALS

A. Delegated Design Submittal: Design drawings for timber bridges signed and sealed by a professional engineer. Include list of codes, loads, and other factors used in design.

B. Product Data: For each product or system designed or certified by professional engineer, indicating that the products and systems are in compliance with performance and design criteria.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm with a minimum of 5 years experience installing, erecting and assembling light maintenance and golf cart timber bridges for golf courses, similar in material, design and extent to those indicated for this project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Treated Lumber, Timber and Piles: Pressure treated with chromium copper arsenate (CCA) type C according to AWPA P5-90 and A2-88.

B. Lumber, 2-Inch Nominal and Larger: Southern Yellow Pine graded under Southern Pine Inspection Bureau (SPIB) rules. Provide kiln dried lumber for curb, curb block, wear decking, hand rails and caps, with a 19% or less moisture content after treatment.

1. Bents and Stringers: S4S (surfaced four sides), No. 2, and having the appropriate grade stamp.
2. Posts and Decking: S4S (surfaced four sides), No. 2 and better, and having the appropriate grade stamp.
3. Handrail Members: S4S (surfaced four sides), No. 1 and better, and having the appropriate grade stamp.
4. Horizontal Abutments: 3" x 12" timbers.

C. Wood Decking: Nominal 3" x 8" timber decking; pressure treated southern yellow pine.

D. Deck Fasteners: Min. #12 x 4.5" galvanized screws recessed 1/8" below deck surface.

E. Timber Pilings: ASTM D25 for round timber piles.

F. Curbing: 4" x 6" curb with 4" x 6" blocks placed on 5 foot centers and bolted with 5/8" diameter A307 hot dipped galvanized timber bolts with a 2-1/4" bolt head.

G. Structural Steel: Use the following:

1. Bolts, Washers and Nuts: 3/4" diameter A307 hex bolts, hot dipped galvanized per AASHTO #M-232.
2. Stringer to Beam Connections: Simpson H 5 clips or equal.
3. Steel Shapes: Hot dipped galvanized, AASHTO #M-111.

PART 3 - EXECUTION

3.1 TIMBER BRIDGE INSTALLATION

A. Locations: Bridge locations indicated on drawings are approximate. Actual locations will be determined in the field by Golf Course Architect.

B. Construct bridges with minimal impact to wetlands or other areas with sensitive vegetation.

C. Perform all work from deck level where required by site conditions, owner or environmental agencies. Limit use of tracked or rubber-tire equipment to upland areas.

D. Contain foot traffic within 6 feet (3 m) of bridge path.

E. Drive piles to required depth with vibratory hammer or other approved method to minimize environmental impact.

3.2 FIELD QUALITY CONTROL

A. Inspections: Notify Golf Course Architect for inspection of each bridge immediately after completion.

END OF SECTION 02851

SECTION 02852 - DRY-LAID STONE WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Dry-Laid Stone Walls

B. Related Requirements:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions.
2. Division 1 Section "Unit Prices" for a schedule of unit prices.
3. Division 2 Section "Site Clearing" for tree protection, clearing, grubbing and disposal.
4. Division 2 Section "Earthwork".

1.3 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Stone Walls: Includes excavation of base, native fieldstone masonry, storage of materials, protection and disposal.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed:

1. Stone Walls: Length of wall installed, measured by tape or wheel in field.

1.4 ACTION SUBMITTALS

A. Product Data: For each stone type and each manufacturer product shown on Drawings or specified.

1. For each stone variety used on Project, include physical property data.

B. Samples: For each stone type required, exhibiting the full range of color and other visual characteristics expected in Work.

1. Submit a minimum of 5 each, 12 inches x 12 inches in size, in each color and finish specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs experienced stonemasons for type of work indicated in this Project.

B. Source Limitations for Stone: Obtain each stone variety from a single quarry.

C. Mockups: Build Full Scale mockups of the approved stone or stones in the approved finishes, erected at a site agreed to by the Architect to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build Full Scale mockup of typical dry-laid stone wall and dry-laid stone retaining wall.
2. Size: Full Scale section at minimum length of 4 feet.
3. Color consistency: Demonstrate color consistency with mockup; color range shall not exceed range of color established in samples.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
6. Inspections: Notify Architect for inspection of each wall immediately after completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and handle materials to prevent deterioration or damage.

1. Stone shall be carefully packed and loaded for shipment using reasonable care and customary precautions against damage in transit. Material, which may cause staining or discoloration shall not be used for blocking or packing.
2. The stone shall be stacked on timber or platforms at least 4 inches above the ground. Care shall be taken to prevent staining or discoloration during storage.
3. If storage is to be for a prolonged period, polyethylene or other suitable plastic film shall be placed between wood and finished surfaces of completely dry stone.

1.7 PROJECT CONDITIONS

A. Stain Prevention: Remove soil to prevent staining of stone face.

PART 2 - PRODUCTS

2.1 STONE SOURCE

A. Each color of stone shall come from a single quarry, with sufficient reserves to satisfy the requirements of the project. The supplier shall have the capabilities to cut and finish the stone without delaying the project.

2.2 STONE MATERIAL

A. Native Fieldstone:

1. Color: Match Existing Appearance, Size, Color and Color Range of existing Entrance Piers.

2. Sizes: random sized rectangular and square stone, minimum 4 inches high.
3. Pattern: random broken coursed ashlar.
4. Finish: smooth.

B. Cap Units/Top Course: Provide cap units/top course with smooth surfaces, minimum 12 by 12 inches and full depth of wall.

2.3 INSTALLATION MATERIALS

A. Leveling Base: Provide a stable and compacted base of suitable granular fill to support wall at dimensions shown in Section Detail A on Landscape Plan Detail Sheet.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Surfaces and Conditions: Prior to installing stone, examine the existing surfaces and conditions to receive the stone and verify surfaces and conditions are in accordance with the requirements and as shown on Drawings.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prior to setting stone, clean all surfaces to remove accumulated dirt and stains. Clean thoroughly by scrubbing with non-metallic brushes followed by a drenching with clean water. Use only methods and products approved and recommended by stone supplier.

3.3 DRY-LAID STONE

A. Field trim stone as required as stone is set.

B. Sort stone before it is placed in wall. Remove stone that does not comply with requirements or that is unsuitable for intended use.

C. Ashlar Pattern : Arrange stones for accurate fit in ashlar pattern with random course heights, random lengths, with offset between vertical joints.

D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.

E. Set stone to comply with requirements shown on Drawings. Set stone accurately in locations shown with edges and faces aligned according to established relationships.

F. Exposed ends of walls shall be formed out of suitable large stones to provide a stable corner.

G. Top course of stone shall be set in mortar to secure them in place.

3.4 CONSTRUCTION TOLERANCES

A. Variations from plane of wall: 1/4-inch in 10 feet.

B. Maximum variation from specified batter: 1/8-inch per 4 feet, non-cumulative.

3.5 ADJUSTING

A. Remove and replace stone not matching final samples and mockups.

B. Remove and replace stone not complying with requirements.

C. Replace non-complying stone to match final samples and mockups, comply with specified requirements. Replacement stone shall show no evidence of replacement.

3.6 PROTECTION

A. At the end of each day's work, cover top of walls with a nonstaining waterproof covering. Protect partially finished work when not being worked on.

3.7 CLEANING

A. Clean stone as work progresses.

B. Final Cleaning: Clean stone as recommended by fabricator or stone producer.

1. Clean all finished stonework with a mild detergent using a fiber brush.
2. After cleaning, rinse with clean water.
3. Do not use acid or other caustic materials.

C. When cleaning is completed, remove temporary protection.

END OF SECTION 02852

SECTION 02920 - GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Sodding.
2. Seeding.
3. Hydroseeding.

B. Related Sections include the following:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions and requirements.

2. Division 1 Section "Alternates" for descriptions and requirements
3. Division 1 Section "Unit Prices" for a schedule of unit prices.
4. Division 2 Section "Site Clearing" for topsoil stripping and stockpiling.
5. Division 2 Section "Earthwork" for excavation, filling and backfilling, and rough grading.
6. Division 2 Section "Shaping" for shaping, finish shaping and topsoil replacement.
7. Division 2 Section "Golf Course Drainage" for inline drains.
8. Attachment: Maintenance Program
9. Attachment: Grow-In Program
10. Attachment: Schedule of Prices

1.3 ALLOWANCES

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:
1. Fertilizer Applications: Includes preparation, application, and clean-up.
2. Sodding: Includes preparation, grass preparation, clean up and protection.
3. Seeding Greens: Includes preparation, grass preparation, clean up and protection.
4. Seeding Tees: Includes preparation, grass preparation, clean up and protection.
5. Seeding Native grass: Includes preparation, grass preparation, clean up and protection.
6. Hydroseeding: Includes preparation, grass preparation, clean up and protection.

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed:

1. Fertilizer Applications:

2. Sodding: Area sodded, measured by number of pallets installed multiplied by quantity of sod per pallet.
3. Seeding: Area seeded, measured by field survey/GPS and excluding sodded area.
4. Hydroseeding: Area hydroseeded, measured by taping, field survey or GPS.

1.5 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil after grass preparation.

B. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

C. Subgrade: Surface or elevation of subsoil or topsoil remaining after finish shaping.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Sod: Harvest, deliver, store, and handle sod according to requirements in Turfgrass Producers International's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."

B. Seed: Deliver seed in original sealed, labeled, and undamaged containers. Store in cool, dry containers.

1.7 SCHEDULING

A. Planting Restrictions: Plant during one of the following periods.

1. Spring Planting:
   a. Sodding: Date to be determined by Owner and Golf Course Architect
   b. Seeding: Date to be determined by Owner and Golf Course Architect
2. Autumn Planting:
   a. Sodding: Date to be determined by Owner and Golf Course Architect
   b. Seeding: Date to be determined by Owner and Golf Course Architect

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

C. Dormant Seeding: Dormant seeding is only permitted by permission of Owner and Golf Course Architect.
1. Dormant seeding is only permitted 2-4 weeks after acceptable germination conditions.

1.8 MAINTENANCE / GROW-IN

A. Maintenance is part of the scope of work provided by the golf course contractor. See the Maintenance Program Attachment for detailed information on tasks, fertilizer applications, and seeding applications.

B. Grow-In is part of the scope of work provided by the golf course contractor. See the Grow-In Program Attachment for detailed information on tasks, fertilizer applications, and seed applications.

PART 2 - PRODUCTS

2.1 TURFGRASS SOD - ALTERNATE

A. Turfgrass Sod: Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: Sod of grass species as follows:

1. Sod (Tee Slopes & Surrounds, Green Slopes & Surrounds, Bunker Slopes & Surrounds)
   a. High ratio fescue sod similar to the seeding specification for these areas. Existing sod from local farms will likely not match our seed selection exactly. So an acceptable substitute will need to be approve by Golf Course Architect and Turf Consultant.

2. Sod Fairways and outer Rough: n/a

2.2 SEEDING GREENS, TEES, APPROACHES, FAIRWAYS/ROUGH

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: Certified seed of grass species as follows, with not less than 85% germination, not less than 98% pure seed and not more than 0.5% weed seed. (ALSO REFER TO GROW-IN PROGRAM ATTACHMENT AND MAINTENANCE PROGRAM ATTACHMENT)

1. Greens: Creeping Bentgrass
   a. 33.3% G-6
   b. 33.3% Mackenzie
   c. 33.3% 007

2. Tees: Bluegrass / Ryegrass Blend
   a. 25% Hampton Kentucky Bluegrass
   b. 25% Jumpstart Kentucky Bluegrass
   c. 25% Midnight Kentucky Bluegrass
   d. 15% Thermal Blue Hybrid Bluegrass
   e. 10% PST2rt Perennial Rye grass

3. Disturbed & Graded Fairway and Approaches: Bent / Fescue Blend
   a. 30% Radar Chewings Fescue
   b. 30% Cardinal Creeping Fescue
   c. 20% Greentime Colonial Bentgrass
   d. 20% Barracuda Creeping Bentgrass

4. Disturbed & Graded Surrounds of Greens / Tees / Bunkers: Blend
   a. 25% Fairmont Chewings Fescue
   b. 15% Wendy Jean Creeping Red Fescue
   c. 20% PST2rt Perennial Ryegrass
   d. 20% Shannon Kentucky Bluegrass
   e. 20% Jumpstart Kentucky Bluegrass
      1) The above blend is the mixture that “Sod – Alternate” should attempt to match as close as possible. Often referred to as a “High fescue Blend” sod.

5. Inter-seeding Fairways:
   a. 30% Radar Chewings Fescue
   b. 30% Cardinal Creeping Fescue
   c. 20% Greentime Colonial Bentgrass
   d. 20% Barracuda Creeping Bentgrass

6. Inter-seeding Roughs
   a. 30% Radar Chewings Fescue
   b. 30% Cardinal Creeping Red Fescue
   c. 30% Beacon Hard Fescue
   d. 10% Midnight Kentucky Bluegrass

2.3 NATIVE GRASSES SEEDING

A. Native Rough: Fresh, clean, dry, new seed, mixed species as follows:
   1. Inter-Seeding of Native Rough Grass (See MAINTENANCE PROGRAM)
      a. Coated Bluestem
      b. Little Big HornFine
      c. Coastal Hair Grass
   2. Native Rough Grass (Graded & Disturbed Areas – See GROW-IN PROGRAM)
      a. 100% Jacklin's Scottish Links Mix (or approved equal)

2.4 INORGANIC SOIL AMENDMENTS / FERTILIZER / PLANT PROTECTANTS

A. Refer to MAINTENANCE PROGRAM and GROW-IN PROGRAM for additional details on fertilizer application
   1. GROW-IN PROGRAM
      a. Pre-Plant fertilizer Greens and Tees

1)	GroWin (5-1-2) Granular Rootzone Amend.	25#/1000 sf.	6 ac.	3 tons

      b. Fertilizer on Greens and Tees

1)	August: Sea-blend Ammonium sulfate (14-2-4)	1# N/1000 sf.	6 ac.	.80 tons
2)	Sept. : Sea-blend Ammonium sulfate (14-2-4)	1# N/1000 sf.	6 ac.	.80 tons
3)	Oct,: Sea-blend Ammonium sulfate (14-2-4)	1# N/1000 sf.	6 ac.	.80 tons

   2. Fertilizer on Surrounds of Greens and Tees / Approaches

a.	Sept: GroWin (5-1-2) Granular Rootzone Amendment	1# N/1000 sf.	10 ac.	4 tons

   3. Hydromulch
      a. A soluble fertilizer (10-10-10) in the tank and during time of high weed pressure a label rate of TENACITY can also be utilized on-site "at seeding" according to label rates. An allowance is outlined below.

1)	Soluble Fertilizer (10-10-10)	1#N/1000 sf.	14 acres

   4. MAINTENANCE PROGRAM
      a. **Fertilizer – Fairways and Rough**

1)	April – Fertilizer Ratio (10-10-10)	1# of Nitrogen/1000 sf.	50	10 tons
2)	May - Fertilizer Ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
3)	June - Fertilizer Ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
4)	July - Fertilizer Ratio (20-2-10)	0.5# of Nitrogen/1000 sf.	50	3 tons
5)	August - Fertilizer Ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
6)	Sept. - Fertilizer ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
7)	Oct. - Fertilizer ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 ton
8)	Lime			
	a) Application 1	1 ton / acre	50	50 tons
	b) Application 2	1 ton / acre	50	50 tons
9)	Gypsum			
	a) Application 1	1 ton / acre	50	50 tons
	b) Application 2	1 ton / acre	50	50 tons
	c) The Lime and Gypsum application and amounts above are allowances and will be adjusted when the soil testing results become available			

b. Fertilizer – Greens and Tees (Grow-In Program fertilizer supplements the fertilizer applications listed below)

1)	Foliar Fertilizer	110 gallons
2)	Foliar iron and Micronutrients	55 gallons

c. **Plant Protectants**

1)	Pythium Damping off Fungicide	2	5 acres
2)	Phosphite material	2	5 acres
3)	Snow mold protection	1	5 acres
4)	Broadleaf weed control	2	12 acres
5)	Crabgrass control	2	20 acres
6)	Fairway volunteer grass	2	30 acres
7)	Native area weed control	1	10 acres
8)	Native grass woody plant control	1	10 acres
9)	Turf Insecticide Application	1	50 acres

2.5 MULCHES

A. Flexterra FGM (or approved equal): Applied at manufacturers recommended rate. This product will be used in all hydroseeding on greens, tees, and bunker surrounds. It is also specified for use on native grass areas that exceed 4:1 slope.

B. Conwed Fibers EnviroBlend with Tack (or approved equal): Use on native grass areas and softer slopes that are less than or equal to 4:1.

C. Futerra Matting: apply and fasten at manufacturer's recommendation / schedule. This product will be used on native slopes adjacent to golf holes that are greater than 3:1 slopes and have the potential to result in erosion and sedimentation of the watercourse on-site.

1. Example areas include; bridge abutments, areas where demolition occurs along the stream, stream bank stabilization from golf construction works, railroad-tie stair construction surrounds, miscellaneous steep slopes that need securing as directed by Golf Course Architect.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding overspray.

B. Identify, mark and protect from damage all sprinklers, turf valves, valve boxes, inline drains, and drainage inspection openings.

3.2 GRASS PREPARATION

A. Limit turfgrass and native grass subgrade preparation to areas to be planted.

1. Golf Course Feature Seedbed Preparation: The standard for preparing these areas is outlined below. These areas include all areas to be seeded or sodded with golf course turf or directly adjacent to the golf course mown turf.

2. Native Grass Hydroseeding Seedbed Preparation: The native areas also need to be prepared for seeding:
    a. Remove rock and debris greater than 2 inches (50 mm).
    b. Grade planting areas to a smooth, uniform surface plane using box blade if accessible. Some areas will have existing vegetation and/or steep slopes. Grading equipment will not be used.
    c. Hand raking and finish work may be necessary in many areas.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane using soil mover or box scraper to achieve the Golf Course Architect's desired finish elevations.
1. Many areas of the site are compact and do not allow for tractors and box blades to execute the work. Smaller equipment such as sandpro (or equivalent) along with hand tools will only be used.
2. Compaction is an issue in areas were larger equipment cannot be used. Compaction with tractor tires and plate compactors may be necessary to achieve desired compaction and avoid features settling (also see Division 2 Section “Earthworks” for more details on compaction)

C. Disking and Rock-Raking: Disk subgrade to a minimum depth of 3 inches (150 mm) in areas of compaction caused by haul roads or other equipment. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off at direction of Golf Course Architect.
1. Topsoil replaced in in repair of golf course features and execution of finish work should be free of contaminants and maintain a standard and quality acceptable to the Golf Course Architect.
    a. Stockpiled topsoil may need to have some mechanical screening with 1” grizzly on-site.
    b. Topsoil management and the importance of conserving topsoil throughout earthworks and shaping are covered in Division 2 Sections “Earthworks” and “Shaping”.

D. Fine Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture.

1. Use a Gill Pulverizer or similar in clay and loam soils, and a drag mat, board float or similar implement in sandy soil.
2. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades.
3. Limit fine grading to areas that can be planted in the immediate future and avoid compacting the top 3 inches of loose friable soil.
4. Fine grade and float green and bunker surrounds using a "Sand Pro" or similar to achieve free-flowing shapes, smooth grade transitions, and finish work of the highest quality.
5. Hand grade around green edges, tee edges, bunker edges, catch basins and other areas inaccessible with larger equipment or that require a keyed edge for sod.

E. Moisten prepared turf areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Restore areas if eroded or otherwise disturbed after fine grading and before planting.

G. Upon approval of grassing by Golf Course Architect apply amendments prior to seeding or sodding.

3.3 APPROVAL OF GRASS PREPARATION

A. Notify Golf Course Architect for inspection of prepared areas to be planted. Do not plant grasses without Golf Course Architect approval of prepared areas.

3.4 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples using at least 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray or irrigation within two hours of planting.

3.5 SEEDING

A. Tees and greens seeded with a drop spreader. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
1. Particular care should be taken in handling and distributing the bentgrass seed.
2. Contamination of adjacent areas with the creeping bentgrass seed will be removed at Contractor's expense and returned to uncontaminated condition.

B. Sow seed at the following rates:
1. Greens: 1.5 lbs. / 1000 sf.
2. Tees: 2 lbs / 1000 sf.
3. Disturbed & Graded Fairways and Approaches: 1 lbs / 1000 sf.
4. Disturbed & Graded Surrounds of Greens / Tees / Bunkers: 1lbs / 1000 sf.
5. Inter-Seeding Fairways:
6. Inter-Seeding Roughs:

C. Tees and Greens: After seeding rake seed lightly into top 1/8 inch (3 mm) of sand mixture, roll lightly, and water with fine spray.
1. See GROW-IN PROGRAM ATTACHMENT for additional details.

3.6 HYDROSEEDING

A. Hydroseeding of Grass Seed for Revegetation: Mix specified native grass seed, fertilizer, and mulch in water. Use equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
1. Apply Mix for Green / Tee / Bunker Surrounds as indicated above in the slurry.
2. Apply Native Grass Seed Mix at supplier's recommended rate for moderate to full coverage.
3. Apply slurry at the rate recommended by the manufacturer for the slope condition.

3.7 CLEANUP AND PROTECTION

A. Remove trash, pallets, netting and other debris created by grassing operation.

B. Erect barricades as required to protect newly planted areas from traffic.

END OF SECTION 02920

SECTION 02930 - LANDSCAPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plants.
2. Planting soils.
3. Hydroseeding

B. Related Sections:

1. Division 1 Section "Allowances" for unit cost and quantity allowance descriptions and requirements.
2. Division 1 Section "Alternates" for descriptions and requirements
3. Division 1 Section "Unit Prices" for a schedule of unit prices.
4. Division 2 Section "Site Clearing" for topsoil stripping and stockpiling.
5. Division 2 Section "Earthwork" for excavation, filling and backfilling, and rough grading.
6. Division 2 Section "Shaping" for shaping, finish shaping and topsoil replacement.
7. Division 2 Section "Golf Course Drainage" for inline drains.
8. Division 2 Section “Dry-Laid Stone Walls” for construction of Walls.
9. Division 2 Section "Grasses" according to Division 2 Section "Grasses." and erosion-control materials
10. Grow- In Program & Schedule for grassing, maintenance and grow in practices.

1.3 ALLOWANCES

A. N/A

1.4 UNIT PRICES

A. Payment: The following unit prices establish the basis for payment of work in this Section:

1. Landscaping: Includes preparation, installation, staking/guying, clean up and protection.
2. Hydro seeding Native Rough: Includes preparation, clean up and protection according to Division 2 Section "Grasses.".

B. Measurement: Provide measurement of work-in-place for unit prices. Use the following methods of measurement to determine actual quantities of work performed:

1. Landscaping: Each, measured by field count of number of plants installed.
2. Hydro seeding Native Rough: Area hydro seeded, measured by taping, field survey or GPS.

1.5 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

D. Finish Grade: Elevation of finished surface of planting soil.

E. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

F. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

G. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

H. Planting Area: Areas to be planted.

I. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

J. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

K. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

L. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

M. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

N. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

O. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
3. Nursery Sources: Submit a list of all proposed nursery sources for approval, confirming the availability of plant varieties, sizes and other conditions as indicated on the plant list. Planting Schedule: Submit the projected planting schedule including digging, delivery, storage and installation dates, to the Architect for

review and approval. Schedule the dates for each type of landscape work during normal seasons for such work in each area of the site. Correlate with specified maintenance periods to provide maintenance until conclusion of planting establishment and maintenance period. Revise schedule as necessary to keep current, subject to the Architect's approval.

4. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 10 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

C. Material Test Reports:

1. For existing topsoil and imported or manufactured topsoil.
2. For compost.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
2. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For existing and imported or manufactured topsoil, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; soluble salts; gravel; deleterious material; pH; lead; and mineral and plant-nutrient content of the soil. Provide separate tests for each proposed topsoil source, type, stockpile, and for each soil with distinctive characteristics.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of ten representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for plant growth.
    a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients calcium, magnesium, and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

4. Submit a 3-gallon control sample of each topsoil composite tested by the soil lab. Label sample with the sample ID name correlating to the Test Report.

D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

F. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. All plants are subject to inspection and selection for overall form, vigor and condition by the Architect at the nursery source or place of growth. Do not dig plant material until inspected and /or approved by the Architect. Contractor must provide all transportation and shall accompany the Architect for all source inspections.
2. If requested by Architect, contractor will coordinate with approved nurseries and the Architect to schedule the Architect's nursery visits, to secure approved plants, and to confirm digging and shipping dates in conformance with the approved planting schedule. Arrange nursery visits as far in advance of the scheduled installation as possible, which will generally occur during the September or October preceding the installation. In all cases, tagging shall be scheduled for completion prior to the onset of anticipated winter conditions that will make the grower's fields inaccessible. All tagging shall be completed by December 15. Summer or fall digging of deciduous plants will not be permitted without the Architect's prior approval.
3. Plants designated as "balled and burlapped" shall be field-grown, and shall not be dug until inspected, approved and sealed by the Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Notify the Architect of delivery schedule at least two (2) days in advance, to arrange for inspections upon arrival to the job site.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Preliminary Acceptance.

1. Spring Planting:
   a. Deciduous plants: March 1 through May 15.
   b. Evergreen plants: March 1 through June 1.
   c. Perennial plants and ornamental grasses: Plant in spring after all danger of frost has passed. Do not plant while ground is still wet or sticky after thawing or heavy from prolonged rain. Complete this work before June 1.
2. Fall Planting:
   d. Deciduous plants: October 15 until the ground freezes.
   e. Evergreen plants: August 15 through October 1.
   f. Bulbs: September 1 until the ground freezes.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

D. Coordination with Turf Areas (Golf Course): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

E. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected. Coordinate Work with other related site work that is not included in this Section. Maintain proper sequencing of operations.

F. Commencement of Work will constitute the Contractor's acknowledgement and acceptance of the proposed plant list, the plant locations as shown on the drawings, and the suitability of all site conditions for the planting Work; and the Contractor's acceptance of the requirements of this Section, including replacement of unacceptable plants during the Plant Establishment and Warranty Period.

G. Notify the Architect at least 2 days prior to commencing any planting operations.

H. Proceed with and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of landscape work required.

I. The Contractor shall bear sole responsibility for the furnishing and application of irrigation water.

J. Plant Locations on the Drawings are approximate and are to be used only as a guide. Architect will stake out locations for all plants and outlines of plant beds. Do not begin excavation until Architect has approved specific layout. Relocate the planting, without extra compensation if directed prior to final installation.

K. Protection of Prepared Beds: Protect topsoil and planting mixtures in prepared planting beds from erosion and displacement until permanent plantings and mulch surfaces become established and stabilized. Provide temporary erosion control blankets or other measures as necessary.

1.9 WARRANTY

A. The Contractor shall warranty to the Owner and Architect that all plants installed under this Section will remain alive and be in a healthy, vigorous condition for the duration of the period. Warranty period will commence upon the completion of all planting work. A sum sufficient to cover the cost of possible replacement plantings will be held by the Owner until satisfactory completion of the Warranty period.

B. Warranty period: one-year (365 days); except that deciduous plants in a dormant condition on the date the warranty commences will be warranted for an additional period, extending through to June 1 of the next following spring.

C. The Contractor shall replace any dead plant or any plant which is unhealthy, unsightly, or which for any cause no longer meets the Specifications, as directed by the Architect. Replacements will be made immediately as seasonal conditions permit. Replacements will be of the same variety and size specified in the plant list, with a new warranty commencing on the date of replacement.

D. The Contractor shall replace or reconstruct any damage caused to surrounding Work or to other improvements, by the plant replacement operations. Any such restoration Work shall conform to the applicable requirements of the Contract Documents.

1.10 INSPECTION AND ACCEPTANCE PROCEDURES

A. Submit Written Notice: requesting inspection by the Architect at least 10 days prior to the date of the requested inspection.

B. All plants that meet the warranty requirements when inspected will be accepted.

C. Should inspected Work not comply with the requirements of this Section, replace rejected Work and continue maintenance until re-inspected and accepted; unless if in the opinion of the Architect, it is preferable to extend the plant warranty period for another full growing season. The Architect will make another inspection at the end of the extended plant warranty period, if any, to determine acceptance or rejection. Remove rejected material promptly from the site.

D. Preliminary Acceptance/ Start of Warranty Period:

1. The Contractor shall notify the Architect when all the Work of this Section is complete and ready for preliminary acceptance. The Architect will conduct an inspection to determine whether all plantings and related work have been completed and installed in accordance with the Contract Documents, and will prepare a list items to be completed or corrected. The Contractor will complete or correct the listed items, and will notify the Architect when all remaining work is ready for re-inspection.
2. When the Architect determines that the re-inspected work has been satisfactorily completed, the Architect will certify preliminary approval of the planting. The plant material warranty will commence on the date of preliminary approval.
3. Subject to the Architect's sole discretion; preliminary approval of the overall planting may be granted even if installation of a few particular plants is unavoidably delayed by seasonal or inventory circumstances that are documented in advance as being beyond the Contractor's control.

E. Final Acceptance/ End of Warranty Period

1. At the scheduled conclusion of the Warranty Period, the Contractor shall notify the Architect of the date when the site will be ready for inspection for final acceptance. The Architect will conduct an inspection to review the condition of the plantings, and whether all required maintenance has been satisfactorily performed.
2. After the inspection, the Contractor will be notified in writing of the plants requiring replacement and any deficiencies in the maintenance.
3. A final inspection of all plants will be held after the replacement planting has been completed and any maintenance deficiencies are corrected.
    a. Replacements shall be the same material, the same size, or larger, planted in the same manner as the original. The Architect shall have sole discretion to approve any Substitutions.
    b. Replacements will be subject to an additional one year warranty, but will be subject to only one additional replacement. After final acceptance, maintenance of replacement plants will be performed by the Owner.
4. The maintenance and warranty periods will end, and Final Acceptance to end of Warranty will be granted, provided the Contractor has complied with the following requirements:
    a. Dead, missing and defective plant material have all been replaced as directed by the Architect.
    b. Plant beds and plant materials have been properly mulched and are free of weeds.
    c. Stakes, guys, saucers, and tree wrapping have been removed at the end of the guarantee period.
    d. Remedial measures directed by the Architect to ensure plant survival have been carried out.
    e. Any damage to lawn areas or site improvements has been corrected.

1.11 MAINTENANCE

A. Period required: begins immediately after planting. Continue until the end of the warranty period.

B. Correct defective Work as soon as possible. Correct dangerous conditions immediately.

C. Replace dead, missing, unhealthy or unsightly plants immediately, as seasonal conditions permit.

1. Replace plants that are damaged or lose their natural form or become less than the originally specified size due to removal of the dead or damaged portions.
2. Replacements shall be of the same variety and size as specified in the plant list.
3. Repair damages to surrounding plantings and other improvements caused by removal and replacement of unacceptable plants. Replanted disturbed material will be subject to the same establishment period as the replacement plant.

D. Perform all cultural care necessary to properly maintain plant viability and keep planted areas in a neat and orderly condition, including but not limited to:

1. Watering
2. Weed removal
3. Spraying as necessary to keep plants free of disease and insects.
4. Applications of lime or sulphur to adjust soil pH to specific plant requirements.
5. Restoring or replacing mulch and edging, and reshaping earth saucers.
6. Adjusting tree supports, and resetting plants to proper grade and vertical position.
7. Pruning dead or broken branches.

E. Arrange inspections of all plant material with the Architect present. Two (2) inspections, one every six months, are required. Each inspection shall be provided when scheduled by the Architect.

F. At completion of warranty period, remove all stakes, flags, guys and anchors.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

F. Perennial plants shall have been growing in the specified container for a minimum of one year (365 days) prior to installation. Root mass shall completely fill the container.

G. Substitutions will be permitted only by Change Order. If substitutions are proposed based on unavailability of the specified plant material, submit conclusive evidence of such unavailability, and proposals for equivalent material.

H. Provide container-grown plants with sufficient root growth to hold the earth intact when removed from containers. Root-bound plants will not be accepted.

I. The condition of plant material roots, shall be subject to a random pre-planting inspection and approval by the Architect.

J. Quantities as shown on the Drawings are given for the Contractor’s convenience. Install every plant shown on the Drawings. Discrepancies will not entitle the Contractor to extra payment.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: Agricultural liming material containing a minimum of 90 percent calcium carbonate equivalent and as follows:

1. 100 percent passing through No. 10 sieve, a minimum of 90 percent passing through No. 20 sieve, and a minimum of 40 percent passing through No. 100 sieve.
2. Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of less than 4.0 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: greater than 40 percent of dry weight.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

2.4 FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

2.5 PLANTING SOILS

A. Planting Mixtures: Suitable existing topsoil stripped and stockpiled from Project site or imported topsoil or manufactured topsoil from off-site sources and mixed with specified soil amendments to produce viable planting mixtures. Obtain topsoil displaced from naturally well-drained sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

1. Existing On-site Topsoil: Verify suitability of existing topsoil to produce viable planting soil. All existing on-site topsoil proposed for re-use shall be screened on-site to remove stones and debris 1 inch or larger, conditioned and amended to meet the specified requirements for topsoil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
2. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration.
3. Topsoil shall conform to the following requirements:
   a. Soil pH: 6.0 to 7.0.
   b. Organic Matter Content: 5 to 8 percent loss of weight on ignition.
   c. Soluble Salts: less than 2.0 mmhos/cm saturation media extract.

d. Gravel content: less than 10 percent retained on No. 10 sieve.
e. Gradation of Sand, Silt and Clay content:
1) Sand: 40 to 75 percent.
2) Silt: 15 to 50 percent.
3) Clay: 5 to 20 percent.
f. Nutrients and amendments: as recommended by the Soil Testing Laboratory.

4. Mix existing topsoil or imported topsoil or manufactured topsoil with the following soil amendments in the following quantities to produce planting mixtures:
a. General Tree and Plant Bed Mixture (Type I): ratio of loose compost to topsoil by volume 1:3.
b. Planting Mixture for Acid-Loving Plants (Type II): ratio of loose sphagnum peat to topsoil by volume 1:3.
5. Uniformly blend materials to produce a homogenous dry mixture so that when placed, no layering within the soil profile will occur.
6. Keep planting mixtures dry until installation.

2.6 HYDROMULCH

A. Hydro mulch: suitable as a top dressing and to broadcast and aid in the establishment of the specified Native Grass Mix, which will provide the ground cover for newly planted areas. Consisting of one of the following:

1. Wood / Cellulose Blend with Tackifier.
2. Conwed Fibers EnviroBlend with Tack or approved equivalent.
3. Flexterra with tackifier or approved equivalent (Use on native grass slopes greater than 3:1)

2.7 PESTICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.8 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal (38-by-38-mm actual) by length indicated, pointed at one end.
2. Wood Dead men: Timbers measuring 8 inches (200mm) in diameter and 48 inches (1200 mm) long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch (2.7 mm) in diameter.
5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
6. Guy Cables: Five-strand, 3/16-inch (4.8-mm) diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches (75 mm) long, with two 3/8-inch (10-mm) galvanized eyebolts.
7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.
8. Proprietary Staking-and-Guying Devices: Proprietary stake or anchor and adjustable tie systems to secure each new planting by plant stem; sized as indicated and according to manufacturer's written recommendations.
a. Products: Subject to compliance requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
1) Foresight Products, LLC; Duckbill Professional Tree Guy System.

2.9 MISCELLANEOUS PRODUCTS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

B. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

C. Free-Draining Material: Sand, gravel, stone or mixtures thereof, with not more than 70 percent by weight passing the No. 40 mesh sieve and not more than 10 percent by weight passing the No. 200 mesh sieve.

D. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C33.

E. Hydro mulch: Mulch slurry consisting of a wood/cellulose blend with tackifier used to broadcast the Native Rough Grass Mix as specified in Division 2 Section “Grasses” and in the Golf Course Grow In Program.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

D. Notify the Architect at least 2 days prior to conducting any planting operations, so the Architect may be present to observe the planting operations. Planting done without proper notification will not be accepted.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make adjustments as directed.

D. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

E. Apply antidesiccant to trees and shrubs as required by site conditions.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant before moving and again two weeks after planting.

3.3 PLANTING AREA ESTABLISHMENT

A. Shape and form the subgrades to the lines and levels needed to achieve the finished grades shown on the Drawings after placement of Planting Mixture.

B. Loosen subgrade of planting areas to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Thoroughly blend planting soil off-site before spreading.
   a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
   b. Mix lime with dry soil before mixing fertilizer.
2. Spread planting soil to depths as detailed on the Drawings, but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
   a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

D. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

E. Application of Mycorrhizal Fungi: Broadcast dry product uniformly over prepared soil in accordance with the manufacturer’s written instructions.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Beds: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate plant pits and beds to the dimensions as detailed on the Drawings.
2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
5. Maintain supervision of excavations during working hours.
6. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

B. Material removed from excavations may not be used as planting soil.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

3.5 TREE AND SHRUB PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 3 inches above adjacent finish grades.

1. Use Planting Mixture Type I or II, as required, for backfill in plant pits and beds.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set container-grown stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.

1. Use Planting Mixture Type I or II, as required, for backfill in plant pits and beds. Use Planting Mixture Type III for precast concrete planters.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Prune, thin, and shape trees, shrubs, and vines as directed by Architect. Remove dead, injured, interfering, objectionable, obstructing and weak branches. Make clean cuts as close as possible to the trunk or parent branch without cutting into the branch collar or leaving a stub.

B. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as indicated on Drawings.

1. Support trees with bands of flexible ties at contact points with tree trunk or with two strands of wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Trunk Stabilization by Staking and Guying: Install trunk stabilization by staking and guying as indicated on Drawings.

1. Site-Fabricated, Staking and Guying Method: Install no fewer than three guys spaced equally around tree.

a. Securely attach guys to stakes 30 inches (760 mm) long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle for each guy wire and tighten securely.
b. For trees more than 6 inches in caliper, anchore guys to wood deadmen buried at least 36 inches (900 mm) below grade. Provide turnbuckle for each guy wire and tighten securely.
c. Support trees with guy cable or multiple strands of tie wire, connected to brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid tree restraint.
d. Attach flags to each guy wire, 30 inches (760 mm) above finish grade.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.8 NATIVE GRASS MIX HYDRO SEED/HYDRO MULCH

A. Hydro seed backfilled surfaces of planting areas and other areas indicated with Native Grass Mix broadcast in a hydro mulch slurry as specified in Division 2 Section "Grasses" and Grow In Program. .

1. Trees and Tree-like Shrubs in Turf Areas: Hydro seed Native Grass with mix and rate specified in Division 2 Section "Grasses" within 36 inch radius around trunks or stems of trees up to 3-1/2 inches caliper and 48 inch radius for larger trees. Do not hydro seed within 3 inches of trunks or stems.
2. Planting Areas: Hydro seed Native Grass with mix and rate specified in Division 2 Section "Grasses" over whole surface of planting area. Do not place within 3 inches of trunks or stems.

3.9 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.10 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.11 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Preliminary Acceptance, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

1. Do not remove Architect's seals; Architect will remove seals during the Final Inspection at the end of the Warranty Period.

3.12 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

B. Remove temporary irrigation system for plant establishment within 18 months of installation.

END OF SECTION 329300

LABOR COMPLIANCE

Keney Golf Course

Maintenance Program – 2014

INTRODUCTION

Purpose and Goals

The purpose of this report is to provide a written description of the maintenance tasks to be performed on Keney GC and the products to be used in executing those tasks. The goal is repair, manage, maintain, and restore the turfgrass conditions at Keney GC to standards commensurate with the best municipal golf courses in the United States and the high standards of the client and our design team.

Timeline

As illustrated in the attached schedules, the work will begin as soon as possible (executed agreement with a contractor) and extend through the 2014 season. Estimated date of substantial completion is November 15, 2014.

Approach

The majority of the existing golf course and its turfgrass will not be disturbed by the proposed renovation work. The golf contractor will treat the golf course as if it is an open golf course in respect to disturbance of the turfgrass/soil outside of the designated "limits of disturbance" on the construction documents. The scope of work for the Maintenance Program focuses on these "undisturbed areas".

The golf course renovation project is working towards a spring of 2015 opening. To achieve that goal the golf course must be maintained and improved significantly in 2014 to have high quality conditions in 2015.

Note that this scope of work is executes in parallel with the Grow-In Program of the disturbed areas of the course and complement those activities. The Maintenance Program and Grow-in Program work toward delivering the same high quality and playable turfgrass in late 2014 to early 2015.

The focus is on refurbishment of the fairways, roughs, and naturalized areas of the course for the best playing conditions long term. As a general approach, the golf course is intended to play firm and fast for golfers. This is achieved by using inputs (fertilizer and water) on an as needed basis to promote a durable and wear tolerant turfgrass community. The inputs will be focused on the "down the middle" portions of the golf course. The focus is on providing high quality playing conditions on the tees, fairways, and greens.

ANALYSIS AND CONSIDERATIONS

Expectations and Standards

The overall standard and expectations for quality of the maintenance is established by way of comparison and example. It is expected that the golf course is maintained equal to the highest quality municipal courses in the northeast United States.

Having said that, the maintenance program described and specified is executed in several stages. First, the program focuses on rehabilitation of the turfgrass from the soil up. There are no golfers in 2014 so the playing conditions and appearance are not the highest priority in the first stages. The initial focus will be on conditioning the soil and improving its chemistry and eradicating weeds while maintaining the existing turfgrass community. In this initial timeframe turfgrass appearance is less important and it is expected that some portions of the existing golf course turf will suffer. This is intentional and will have the beneficial side effect of eliminating some of the weaker and less desirable grass species. This is further described in subsequent sections. Once the golf course infrastructure is installed (drainage and irrigation) there will be a shift in focus to maintaining the golf course closer to actual playing conditions and getting it ready for spring of 2015.

Turfgrass / Agronomy Consultant

Scott Ramsay is assigned as the Turfgrass Consultant (TC) for our design team and will be providing advice and direction throughout the project to assist the golf course superintendent/contractor to execute their duties. Mr. Ramsay's role is advisory and not day to day on-site.

Selection and Nomination of Golf Course Superintendent for 2014

The time frame and expectations of this project require a full time qualified golf course superintendent. Dusenberry Design and our design team will select/nominate a qualified golf course superintendent and the selected contractor will hire this person directly to supervise and execute the Maintenance Program and Grow-In Program as outlined in this document.

The golf course superintendent should commence work as soon as possible as maintenance duties begin early in the spring season. Compensation requirements are based on $75,000 per annum salary.

Staffing / Labor Recommendations

This report will make recommendations to the contractor for staffing needed to execute the scope of work. These serve only as guidance, the contractor will need to provide the necessary labor to perform the tasks to the highest standard.

Dynamic Conditions / Flexibility in the Maintenance Program

This report outlines the best practices for executing the works under normal seasonal conditions. The contractor recognizes that the conditions change year to year and that the maintenance program needs to flexible to respond to those conditions and deliver the highest quality turfgrass conditions.

Tasks

Soil Testing

Collect soil samples as soon as weather conditions allow. The soil should be thawed and not frozen. The following tasks and testing to be completed;

- Collect and label samples from each hole. Topsoil samples (free of vegetation) placed in 1 quart Ziploc bags. Record and note location of each sample taken.
- Sample taken from each hole from the middle of the fairway at the landing area and the directly adjacent rough.
- Repair areas where soil sample was taken.
- Samples should be sent to certified laboratory for the following;
    - Tests should be performed to identify deficiencies in soil nutrients to support golf course turf.
    - Parameters for standard nutrient ranges should be indicated on the results as well as recommendations for remediation of any soil nutrient deficiencies.
- Fees and costs of testing are responsibility of the contractor. Expedite testing and distribution of results. Soil tests are needed for defining/finalizing a fertility program.
- Distribute results electronically via e-mail to the Golf Course Architect (GCA) and the Turfgrass Consultant.

This information will be invaluable to the restoration of the soils and to provide a road map for the future agronomic programs. Existing conditions indicate that the "basics" have not been done. Lime, fertilizer and weed controls are lacking. The soil test will indicate the challenges that lie below and it will guide our decisions on applications during the season.

Site Clean-Up / Preparation

Clean-up of the site should start as soon as possible in the spring. It will be important to get the property cleaned up and communicate the progress of the project to park users and Hartford residents. The work should start at the clubhouse area and along the park entrance road and progress into the site.

The following tasks are needed as part of the site clean-up;

- Remove leaves, branches, and other debris from all turf areas and accessible forest areas. The golf course leaves were not removed in the autumn of 2013 so there is a high volume of leaves in the wooded areas of the site.
- Remove trash and other debris from the site.
- Remove and dispose of existing golf course accessories and furniture.

Trash should be removed from the site and properly disposed of in accordance with local and state regulations.

Start Mowing Program

Begin work mid-April (as soon as possible) following the site clean-up efforts. Since the golf course will not be open for play the turf areas do not need to be maintained at

playing heights of cut initially. The irrigation system will not be functional for most of the summer. As a result, it will not be possible to maintain the existing turf at low mowing heights throughout the season.

- GCA to identify limits of mowing (define naturalized areas initially and then fairway mowing limits as the season progresses) Some areas will be converted to naturalized areas and will not be mown regularly during the 2014 season.
- Set mowing height at 1.5" to start program. Mow tees, fairways, and roughs all the same height. If weather conditions allow, there may be some further definition of fairways with lower mowing heights (down to ½").
- Frequency of mowing is dependent on plant growth. Mowing should be scheduled so that not more than 1/3 of the leaf blade is removed during each mowing.

Initial Focus on Maintenance and Soil Structure

In addition to mowing, the majority of the resources are initially focused on improving the soil structure and growth medium for the areas between the tees and greens. The irrigation project and other elements of this refurbishment will be proceeding and until they are completed (by zone or area) we will not be seeding the fairways and rough. As indicated in the schedule, the seeding will commence in late July to early August to take advantage of better weather and soil conditions.

This project is much like a building project; first you demo, secondly refurbish the structure then add the physical facilities and finally cover it all with Sheetrock and paint, turf cover is this projects paint. Grassing the roughs, fairways and native grass areas will only succeed after the drainage is improved, the tree work is complete and the irrigation is finished. Then the painters can be scheduled.

Weed Control

April is historically the month when crabgrass control is applied. A good indicator plant is forsythia, when it begins to bloom it is also time to apply crabgrass control. Soil temperatures and weather are highly variable each year but this is typically a good indicator.

A selective crabgrass treatment is recommended. We do not want any pre-emergent volunteer grass weed control products used. Once forsythia has bloomed it is recommended to scout for crabgrass and treat in a post emergent practice on a spot basis. This effort can continue into July. This post emergent approach will lower the necessary sprays to a minimum but most importantly it will extend the seeding window and success for this project. A pre-emergent approach is not recommended because it would hinder the seed germination for the desirable grasses for 2014 and virtually eliminate any chance of a May or June seeding. There are two seeding windows, one is in May/early June and the other continues from early August into the fall. The soil temperatures in July render a high summer effort fruitless.

Monitoring and scouting the property for weeds both broadleaf and volunteer grasses and applying the appropriate products during this time frame will ensure an unencumbered seed bed and seeding success. There are multiple broadleaf control products and all are very effective. LONTREL is being specified for its safe and effective

control of broadleaf weeds on the fairways, rough, and naturalized areas. Again this product will be used on a selective "spot" basis. Additional site investigation by the Turfgrass Consultant and golf course superintendent will be possible after snow thaw and site clean-up. These may lead to more specific recommendations or adjustment to the products used.

The volunteer grass spray program needs to be split into three separate practices. The fairways have multiple issues with volunteer grasses which are out competing the desirable turf, so a multi-prong approach is needed on fairways.

Fairways

1. Spot spraying for crabgrass should include a product called DRIVE and should begin as the leaves emerge in the fairways.
2. A separate but concurrent regimen should also begin using VELOCITY to remove the other volunteer grasses such as *Poa annua*. The golf course should be looking less than pristine at this point, lack of irrigation, bare areas and the effects of weed control will essentially be one step backwards but will ultimately provide a launching point for 5 steps forward. The factors that allowed these volunteer grasses to thrive and exist are compaction, shade, poor drainage and a lack of a consistent fertility program. A healthy soil coupled with new infrastructure will be the best weed control in the future. This is a unique opportunity to ensure a healthy and sustainable turf population for the future. The building construction analogy used earlier should be reemphasized at this point, the worse it looks during this demolition process the better the final product will be.

Rough

3. The primary rough areas should be treated separately since ultimately the rough turf will be different from the fairways. This will provide for better defined mowing lines and an improved playing surface. The roughs should be spot treated with a newer herbicide called TENACITY. This product will eliminate the volunteer grasses in the roughs as well as some of the finer grasses that would be desirable in fairway turf but not in the roughs. Tenacity should only be used in the rough defined areas. Should any crabgrass persist, spot applications of DRIVE can continue into July.

Naturalized Areas

4. The naturalized areas should also be managed as a separate entity. The areas should be monitored and scouted for broadleaf weeds and typically alternating spot sprays of LONTREL or BRUSHMASTER will remove the herbaceous and woody weeds in these areas. A separate but concurrent spray of SEGMENT in the native/ naturalized areas will be needed. Much like removing the fairway grasses from the roughs we want to remove the rough grasses from these native grass areas. The desirable bluegrasses and ryegrasses become too thick, gnarly and unplayable once they are left to grow "knee high." Thin, wispy and waving in the breeze are desirable descriptive traits for the ideal naturalized area. Once they are established and cleaned up the maintenance can be as little as one off-season mowing.

Fertility Program

The fertility program begins in April as soon as the course is free of debris and firm enough to operate equipment. Once the soil tests have been completed some adjustments to this program may be necessary. The existing soils have likely been "mined out" of nutrients and significant inputs are needed.

- Alternating applications of lime, gypsum and fertilizer should continue throughout the entire growing season of 2014. Lime and gypsum will improve soils health, structure and friability, making more soil nutrients are available to the plant.
- Apply one pound of a nitrogen based fertilizer monthly for the growing season on the fairways and rough (not naturalized areas).

Cultivation / Aeration

Comprehensive aeration of fairways and rough are needed up to four times during the season. Initial timeline recommendation;

  - Aeration 1: May
  - Aeration 2: June
  - Aeration 3: August (just prior to seeding)
  - Aeration 4: Late fall / early winter. This aeration application is tentatively scheduled and an evaluation of conditions by the TC will be necessary prior to executing the work.

Aerate fairways and rough at a depth of 2-3 inches with ¾" diameter solid tines. This is a cleaner process that focuses on reducing compaction.

Root Pruning

Root pruning of the trees is needed on several areas around the golf course. The contractor should utilize a large tractor and a root pruning device that will be tree friendly, minimally invasive to the golf course, and will ultimately benefit the establishment of the rough grass.

Root pruning performed by a vibratory plow attachment at a minimum of 1 foot deep and should commence ASAP. Prior to install of any new infrastructure (drainage, irrigation, etc.).

- Specific location will be at the direction of the TC and GCA. We'll have an allowance of 5000 linear feet. This will likely be executed in two stages. Approximately 3000 lf. performed in the first application. The remainder will be executed on an as needed basis.
- The focus will be on holes 1, 2, 4, 5, 7, 8, 9, 10, and 17.

Repairs are minimal since it is a slice and not a trench, several loose separated roots may require hand cutting at the surface. The pruning line should be at or just inside the drip line of the tree for the first procedure to reduce the impact on the trees.

Seedbed Preparation / Seeding / Establishment

Fairway Seedbed Prep / Seeding

As an initial step, the fairways will start to be defined in May and progress to lower and lower mowing heights until reaching ½" by early August prior to the fairway

overseeding. The turf should be tight, firm and thin by this time which will provide the perfect transitional seed bed. The existing grasses that are still thriving will make a good companion grass to the newer varieties that will be introduced to the fairways.

Keep the fairways as dry as possible throughout the spring and early summer to discourage the weaker grasses and just prior to seeding soften the fairways with adequate irrigation to receive the seed through a slice seeding process. A blend of fescue/colonial bent/creeping bent seed is specified for the fairways.

30% Radar chewings fescue
30% Cardinal creeping fescue
20% Greentime colonial bentgrass
20% Barracuda Creeping Bentgrass

- All seed should meet CERTIFIED status.
- Seed should be applied at ½ rate in two directions at diagonal to the line of play.
- The fertilization plan accounts for the seeding plan needs. The soil test results should confirm any further needs.

Roughs Seedbed Prep / Seeding
The roughs require a blend of fine fescues and a Kentucky bluegrass selection. It is the ideal blend to meet our goal of a classic era golf course with a sustainable maintenance program. Conserving resources, especially water, is the main concern with this selection since Keney GC is dependent on purchasing water from the MDC. It is our goal to have a dry and sustainable presentation of the golf course. The end result is superior conditioned turf that is fun for golfers to play on.

30% Radar Chewings fescue
30% Cardinal Creeping red Fescue
30% Beacon hard fescue
10% Midnight Kentucky Bluegrass

- All seed should meet CERTIFIED status.
- A single direction application parallel to the line of play and following the boundary of the rough/fairway line marked by the GCA.
- The fertilization requirements are outlined in the fertility plan. Subsequent fertility may become necessary following soil test results.

Fairway and Rough Establishment
August
The turf management protocol for the establishing the over-seeded fairways and rough will be similar to the Grow-In Program recommendations for establishment of greens and tees (see Grow-In Program report).

- Monitor and scout for diseases.
- Keep the seed bed moist but not wet.
- Water during the daylight hours and mow during the afternoons always follow a mowing with a 6 minute cycle of irrigation. It is critical to mow

seedling turf with properly adjusted mowers so that they are not torn out of the ground.
- Most weeds that may be present at this time will typically succumb to a mowing regimen but a spot spray in late September may be necessary.

September

September is when all of the work will come together and a golf course with immense potential will begin to emerge. It is critical to keep the throttle down through the middle of the month, the water regimen and nutrient applications are important. The middle of September the days are shorter the nights are cooler so the water requirements are less critical. This is also a great time to double back and deal with the details and finer points of the property, sink holes, knobs and knolls that need extra attention, repairing haul roads, irrigation lines and many other punch list items.

October

October is still a great month to seed and plant, should it be necessary. It is also the time to start weaning the course from all of the water and fertilizer grow-in regimens. Nature is in charge in late autumn and having the golf course too lush may lead to winter injury. Lower the frequency and rates nitrogen by Columbus Day and the automatic overhead irrigation completely off. Most areas that need to be irrigated can be tackled with a hose.

November

November should signal the end of mowing and the beginning of the heaviest leaf removal. The leaves and debris cannot be allowed to accumulate on this turf as it is young and tender and it will delay it's maturing to its best ability.

Contractor to purchase and install greens covers (they become property of Keney GC after construction). Cover the greens in the late fall enhance the greens maturation process. They can be deployed as needed and removed on warmer days and to perform mowing and sprays then re-deployed for cool nights. This greenhouse effect will provide an extended growing season and may be a key to determining, "opening day."

- **Golf Course Greens Covers (Permeable)**
  - Purchase and install green covers. Covers to be custom made to match the dimensions of each green complex.
  - 7 mil fabric. UV protected/resistant
  - long lasting UV treated reinforcing scrim
  - Minimum 10 year warranty
  - fabric to allow the proper amount of water and airflow to pass
  - frabric to have proper translucency to create a greenhouse effect

Winterize Golf Course

In addition to leaf clean-up and application of plant protectants (snow-mold) the golf course will need to be winterized. The first task is protection of the golf newly seeded areas. Greens being the top priority.

- Snow-fence or similar product should be installed around each green complex for protection against wildlife and people on the golf course during the winter.

The golf course irrigation system will need to be winterized. This involves winterizing the pumpstation and removing the water from the irrigation pipes and heads on the golf course. AASI (Irrigation Designer) and TC can provide more detail on the procedure and best practices for completing this work to minimize/eliminate all damage to the system.

CONCLUSION / SUMMARY

This is a wide ranging and encompassing assessment and action plan to restore the Keney Golf course. It is meant to provide some fluidity to the overall projects time table. This report was written while the course is covered with two feet of snow, invariably adjustments will be needed adapt to the schedule and progress of other project elements (construction). Weather is the great unknown and it is recognized that weather can have a great impact on scheduling. Day to day schedule of activities are important but the emphasis is on the overarching agronomic principles.

The following attachments provide further specification and details for equipment, materials and tasks performed in executing the Maintenance Program.

ATTACHMENT A: EQUIPMENT REQUIREMENTS

ATTACHMENT B: AGRONOMIC SERVICES

ATTACHMENT C: MATERIALS LIST - QUANTITIES

Attachment A: Equipment Requirements

Quantity	Description
1	Rough Mower, 40 HP, 5 floating rotary heads, 100-130 inch swath
1	Fairway Mower, 40 HP, 5 reel mower heads, 100-130 inch swath
1	Triplex greens/tee mower, 18 HP, 3 reel mower heads, 60 inch swath
2	Greens walking mowers, 8 HP, Floating single head, 20-25 inch swath
1	150-200 gallon turf sprayer, Hose reel, 30 HP, Light footprint
2	Utility turf vehicles (Toro workman, Cushman truckster, John Deere gator, or equivalent)
3	Utility golf carts with work bed and trailer hitch
1	Tow behind Fertilizer spreader
2	light duty trailers to be towed behind golf carts
1	Turbine style leaf blower that is towable
1	Leaf sweeper that is towable

Other

Various hand tools as needed - Line trimmers, back pack blowers, shovels, rakes, tarps

It is recommended to search the previously owned market to fulfill these needs. This is the minimum equipment needed and is meant to grow-in and open the golf course; these tasks tend to be demanding on equipment and ages them quickly.

Attachment B: Agronomic Services

Additional equipment resources needed to perform the work would include large aeration, cultivation and seeding equipment. There are several contractors in the Connecticut area that offer these services. They have specialized equipment and can typically execute the work in an expedited manner.

A listing of several qualified sub-contractors are listed below for reference. All sub-contractors considered for these tasks must have extensive experience in executing the work to the highest standard and care on golf courses.

Aeration and Cultivation Companies

Turf Pounders	www.dryjectne.com
Turf Links	www.turf-links.com
Championship Turf	(860)-495-0219
Hillcrest Turf Services	www.hillcrestservices.net

Agronomic Services

Atlantic Golf and Turf	www.atlanticgolfandturf.com
Turf Links	www.turf-links.com
Championship Turf	(860)-485-0219

Root Pruning Services

Hillcrest Turf Services	www.hillcrestservices.net

Attachment C: Materials List – Quantities

Fertilizer- Fairways and Roughs

Item / Description	Rate	Area (ac.)	Quantity
April – Fertilizer Ratio (10-10-10)	1# of Nitrogen/1000 sf.	50	10 tons
May - Fertilizer Ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
June - Fertilizer Ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
July - Fertilizer Ratio (20-2-10)	0.5# of Nitrogen/1000 sf.	50	3 tons
August - Fertilizer Ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
Sept. - Fertilizer ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
Oct. - Fertilizer ratio (20-2-10)	1# of Nitrogen/1000 sf.	50	6 tons
Lime			
Application 1	1 ton / acre	50	50 tons
Application 2	1 ton / acre	50	50 tons
Gypsum			
Application 1	1 ton / acre	50	50 tons
Application 2	1 ton / acre	50	50 tons

The Lime and Gypsum application and amounts above are allowances and will be adjusted when the soil testing results become available.

Fertilizer – Greens and Tees

Foliar Fertilizer	110 gallons
Foliar iron and Micronutrients	55 gallons

Plant Protectants

Description	No. of Applications	Area (ac.)
Pythium Damping off Fungicide	2	5 acres
Phosphite material	2	5 acres
Snow mold protection	1	5 acres
Broadleaf weed control	2	12 acres
Crabgrass control	2	20 acres
Fairway volunteer grass	2	30 acres
Native area weed control	1	10 acres

Native grass woody plant/grass control	1	10 acres
Turf Insecticide Application	1	50 acres

Seeding

Item / Description	Rate	Area (ac.)	Quantity
Inter-Seeding Fairways			
30% Radar chewings fescue			
30% Cardinal creeping fescue			
20% Greentime colonial bentgrass			
20% Barracuda Creeping Bentgrass			
First Application (August)	1#/1000 sf.	30	1400 lbs.
Second Application (tbd)	1#/1000 sf.	5	250 lbs.
Third Application (tbd)	1#/1000 sf.	5	250 lbs.
August Inter-Seeding Rough			
30% Radar Chewings fescue			
30% Cardinal Creeping red Fescue			
30% Beacon hard fescue			
10% Midnight Kentucky Bluegrass			
September Seeding	1#/1000 sf.	20	900 lbs.
Native Grass Areas			
Blend of low maintenance grasses- requires 100 pounds of seed			
Coated Bluestem	16#/ acre	10	160 lbs.
Little Big HornFine			
Coastal hair grass			

Miscellaneous

Green Covers

Permeable golf course green covers	Approx. 180,000 sf.	19 greens

- Assumes the size of the golf course greens plus an additional 35-40% for overlap into the surrounds (ie. A square covering a circle).

Snow Fence / Winter Turf Protection

Wooden snow fence with posts - (400 lf./green x 19)	7600 lf.

Keney Golf Course
Grow-In Program – 2014

INTRODUCTION

Purpose and Goals

The purpose of this report is to provide a detailed written program for the establishment of new turfgrass at Keney GC and the products used in executing those tasks. The goal is to grow-in and establish turfgrass in the disturbed and newly construction portions of the golf course. These areas will be grown-in and maintained long term to a standard that is commensurate with the best municipal golf courses in the United States and the high standards of the client and our design team.

It is also the goal to establish the turfgrass in a manner which is consistent with the desired playing conditions of the golf course long term. Our long term goal is to provide exceptional playing surfaces that are dry, lean, and firm. Often referred to as "firm and fast" conditions. Fewer inputs (water and fertilizer) have the dual benefit of lower maintenance costs and superior playing conditions. A sustainable concept financially and environmentally by conserving resources.

ANALYSIS AND CONSIDERATIONS

Expectations and Standards

The overall standard and expectations for quality of the maintenance is established by way of comparison and example. It is expected that the golf course is maintained equal to the highest quality municipal courses in the northeast United States.

The focus of the grow-in will be on building a strong and healthy plant that is ready for play in the spring of 2015.

Turfgrass / Agronomy Consultant

Scott Ramsay is assigned as the Turfgrass Consultant (TC) for our design team and will be providing advice and direction throughout the project to assist the golf course superintendent/contractor to execute their duties. Mr. Ramsay's role is advisory and not day to day on-site.

Infrastructure Improvements & Renovation of Golf Course Features

Existing condition of the golf course features (greens, tees, bunkers) and the infrastructure have deteriorated to the point where replacement is necessary for delivery of the desired playing conditions.

Seeding Timeframe

Ideal months for Seeding are May-June and August-September. The soil temperatures in July in Connecticut are simply too hot for cool season grasses to succeed. Typically, seed will lie dormant in the soil when it is too warm. Other factors limiting success are weed competition and the abundance of plant pathogenic fungi that can decimate a seeding overnight. There were many of these nights in July of 2013 in Connecticut.

The construction schedule and availability of water will not allow for seeding in the May-June window. The single best time to plant bentgrass is August and this works well with the construction schedule.

Greens

Seedbed Preparation / Pre-Plant Amendment to Greens

The decision has been made to construct a USGA style greens complex throughout the project. This is a very sound decision and will ensure years of successful and sustainable management. A 90/10 mix is specified. This is a mix of approved sand blended with an organic material off-site. The organic component specified is ALL-GROW. ALL-GROW develops a much better soil than traditional peat moss organic and is quicker to establish new seed. More importantly, ALL-GROW allows the green to mature quicker.

Once the greens mix is in place and prior to the final "float", apply a pre-plant starter fertilizer product into the top 2-3 inches of the greens mix.

- Use the pre-plant fertilizer GROW-IN at 25 pounds per thousand square feet. This is an effective pre-plant fertilizer that ensures germination, quicker establishment and can effectively move up the greens maturation time table. This is the only granular product specified for grow-in but it is a critical foundation step that will build up the greens mix into a solid, receptive growth medium. Successive fertilizer applications will be mostly foliar applications and will be detailed later.

When the greens mix has received its final "float" the surface should firm enough to allow only a minor foot print impression. I recommend using a sand pro vehicle with knobby tires to place the seed in contact to the greens mix, so the surface should be firm enough to support the equipment but soft enough to allow 1/4 inch tire "dimples." The seed bed should be prepared consistently for the green and the collar. The close cut areas around the greens and approaches should be prepared and seeded at the same time as the green surface.

Greens – Seeding and Early Establishment

The greens are seeded with a blend of three creeping bentgrass varieties. The three varieties selected will function together and provide uniform putting surfaces. They are excellent establishers and will be the quickest to mature and make opening day a

success. The benefits of each selection will complement each other and meet the challenges of this unique project. The greens are a blend of the following creeping bentgrass varieties;

33.3%	007
33.3%	Mackenzie
33.3%	G-6

The seed should be applied with a calibrated drop spreader in at least two directions perpendicular to each other. Note that care should be taken so that the calibration of the spreader and the application deliver the total rate recommended. For example, if applying in two directions then the drop spreader should be calibrated to deliver 50% of the recommended rate. Once the seed is on the surface a sand-pro should carefully dimple in the seed so that it is pressed into the greens mix surface. Then a spin or two of the irrigation surface should be applied to set the seed further. The greens mix must remain moist but not wet; watering should be done during the days and should be monitored continuously. Too much irrigation will result in erosion and dislocation of the seed. A consistent and continual syringing of the greens surface needs to begin at this point and continue for the next six to seven days.

Typically at that time the seed will have imbibed enough water and visible signs of leaf material will be visible. Diligence is the key to success at this point. Turf grass diseases must be monitored as well as larger varmints. Wildlife such as Skunks and birds can be as troublesome as microscopic fungi.

The watering regiment should continue during the second week. Daily syringing very other hour to keep the seed bed moist is critical. Remedial repairs should be done at this time. Slopes, pockets and areas around sprinklers that do not present turf cover in this initial 10-12 day germination period should be touched up with a blend of the greensmix and seed then lightly tamped.

The greens turfgrass growth should be monitored and mowing should be considered at this point. When the turf height surpasses 1/4 inch be prepared to mow, once the turf is at 3/8 inch begin mowing, the turf should never surpass 1/2 inch in heights. It is crucial to use sharp and well-adjusted walk mower with a floating head and a smooth front roller set to 1/4 inch mowing height. Mowing should take place in the late morning to afternoon and the surface should be dry and firm. Once the mowing is completed two spins of an irrigation head will be needed to set the green. Mowing should be scheduled to maintain the turf height between 1/4inch and 3/8 inch, however often is needed to keep the turf between these heights. Typically every other to every third day is required but will be highly variable due to weather factors.

Greens surface, collars and close cut areas should all fall under the same regimen as the greens for the first month. Then the mowing lines can be determined to define the greens edge and the short cut areas. I recommend that the short cut areas around the greens be allowed to grow out to 1/2 inch and lower the greens height to 3/16 inch. Depending on the time of year a gradual lowering of the height should be a weekly consideration and should be determined after a visual inspection after each mowing. The goal for the 2014 season is to have the final height at 5/32 inch for the greens.

Future maintenance expectations can be considered in 2015 with a final greens height in the 1/8 inch once the course is ready for play. I have expressed these heights as a fraction because I feel it reads better; in practice I recommend a digital device to adjust mowers to be painstakingly accurate (for example 1/8 inch would actually be .125").

Spray Schedule for Greens (Fertilizer and Fungicides)

A spray schedule should begin after several mowing's when the turf can withstand further traffic. A listing of fungicides and foliar fertilizers are noted in Attachment A: Materials for Grow-In Program.

Pythium damping-off is a primary concern and a rotation of fungicides should be employed according to weather conditions, site inspection, and surface conditions. It is likely with this project and the grow-in time frame the only other concern will be to apply a proper snow mold preventer in November.

A foliar fertilizer program will be essential to encourage the grass to spread laterally and creating a more mature stand of turf. There will be plenty of fertilizer in the greens mix from the pre-plant application but I recommend "spoon feeding" nutrients and micronutrients through a sprayer directly to the leaves.

Tees

Seedbed Preparation / Pre-Plant Amendments to Tees

The second area that will be disturbed and reconstructed from scratch will be the tees. The tee area will be expanded to help spread the wear and traffic on the turfgrass.

Tees typically receive the most wear and need special consideration for seed selection. Many of the concepts presented in the greens program can and should be considered with grow-in and establishment of the tees. Sunlight, air movement and drainage are as important for tee construction. The tee mix will be a blend of approved sand and on-site approved topsoil. The mixing process will be executed on-site in a clean location approved by TC and GCA.

Seeding and Early Establishment – Tees

Tees are seeded to a low mow bluegrass/ryegrass/fescue blend on the tee tops. In this situation it will be easier and more effective for the future maintenance to provide a quality surface with these grass types. Tee establishment can mirror the greens protocol. I recommend allowing the heights to be maintained at 3/4 inch from the outset and then can be adjusted down to 1/2 inch once the golf course opens. As with greens, mowing frequency depends on the weather conditions and growth of the turfgrass. As a general rule, mowing should not remove more than 1/3 of the leaf blade.

Approaches and Surrounds of Greens / Tees

The features and disturbed areas around the tees and greens can either be sodded to a high percentage fescue sod or hydro seeded to a triplex blend of fescue/bluegrass/ryegrass. Contractors will be asked to provide pricing for both so that a cost evaluation can be made. The choice between sod and seed is largely based on how quickly the area needs to be open for play. Sod will typically be limited to bunker surrounds and problematic slope areas. In this project it is a huge advantage that the turf will not be subjected to traffic until 2015.

Hydro-seeding applications should incorporate starter fertilizers and weed controls in a one step process. A soluble fertilizer in the 10-10-10 ratio included and in times of high weed pressure a label rate of TENACITY can also be utilized. This will be an "at seeding" decision by the TC and golf course superintendent.

These tie-in areas should receive 1 pound of nitrogen throughout the fall with a granular application of a (5-1-2) analysis fertilizer comprised of mostly readily available nitrogen.

Native Grass Areas – Seeding

Out of play areas that are disturbed during construction will undergo seedbed preparation in conjunction with the other grassing areas. The seed mix is outlined in the Materials section below. The seed mix is consistent throughout the site on disturbed areas. There is an allowance for 2 acres of native grass seeding on steep slopes (greater than 3:1) that could include tee slopes, streambank slopes, etc. An additional 2 acre allowance accounts for the more gently sloped native grass features. This would include tees, bunker, and green surrounds as well as the "islands" in the larger natural bunkers.

Fertilizer for these areas are added to the tank slurry (Soluble 10-10-10)

CONCLUSION

Some items in the Maintenance Program cross-over and are applicable to the Grow-in Program. As with the maintenance program, flexibility in the tasks and schedule are necessary due to changing weather conditions. The intent of this plan is to provide enough guidance and purpose but allow enough flexibility to meld into the greater project.

Attachment A: Materials List – Quantities

Fertilizer Applications

Item/Description	Rate	Area	Quantity
Pre-Plant fertilizer Greens and Tees			
GroWin (5-1-2) Granular Rootzone Amendment	25#/1000 sf.	6 ac.	3 tons
Fertilizer on Greens and Tees			
August: Sea-blend Ammonium sulfate (14-2-4) Blend	1# N/1000 sf.	6 ac.	.80 tons
Sept. : Sea-blend Ammonium sulfate (14-2-4) Blend	1# N/1000 sf.	6 ac.	.80 tons
October: Sea-blend Ammonium sulfate (14-2-4) Blend	1# N/1000 sf.	6 ac.	.80 tons
Fertilizer on Surrounds of Greens and Tees / Approaches			
Sept: GroWin (5-1-2) Granular Rootzone Amendment	1# N/1000 sf.	10 ac.	4 tons

Hydromulch

A soluble fertilizer (10-10-10) in the tank and during time of high weed pressure a label rate of TENACITY can also be utilized on-site "at seeding" according to label rates. An allowance is outlined below

Soluble Fertilzer (10-10-10)	1#N/1000 sf.	14 acres

Seeding Applications

Item/Description		Rate	Area	Quantity
Greens				
33.3%	G-6 Creeping Bent.			
33.3%	Mackenzie Creeping Bent.			
33.3%	007 Creeping Bent.			
		1.5#/1000 sf.	3.5 acres	225 lbs.
Tees				
25%	Hampton Kentucky Bluegrass			

25%	Jumpstart Kentucky Bluegrass			
25%	Midnight Kentucky Bluegrass			
15%	Thermal Blue Hybrid Bluegrass			
10%	PST2rt Perennial Rye grass			
		2#/1000 sf.	4 acres	320 lbs.

Fairway / Approach Area

30%	Radar chewings fescue			
30%	Cardinal creeping fescue			
20%	Greentime colonial bentgrass			
20%	Barracuda Creeping Bentgrass			
First Application (July/August)		1#/1000 sf.	6 acres	270 lbs.

Surrounds of Greens and Tees / Approaches

Seeding

25%	Fairmont Chewings fescue			
15%	Wendy Jean Creeping red fescue			
20%	PST2rt Perennial Ryegrass			
20%	Shannon Kentucky Bluegrass			
20%	Jumpstart Kentucky Bluegrass			
First Application (July/August)		1#/1000 sf.	10 acres	450 lbs.

Hydromulch

Seeding rates as outlined above (broadcast in the mulch slurry)

Flexterra FGM (or approved equivalent) Flexterra hydromulch used on surrounds and steep slopes on golf course features greater than 5:1 slopes tee surrounds, green surrounds, and bunker surrounds

Application Area = 10 acres

Sod

The existing sod available will determine the exact blend of turfgrass varieties available to the project. Contractors should select a "high fescue" sod that is as close to the seed blend as possible.

Start harvesting in July/August 10 acres

Native Grass Mix

Seeding

100% Jacklin's Scottish Links Mix (or approved equal)
Rate: Supplier recommended rate for moderate initial coverage.
Area: 4 acres

Hydromulch

Seeding rates as outlined above (broadcast in the mulch slurry)

Slopes less than 3:1 2 acres
Wood / Cellulose Blend with Tackifier. *Conwed Fibers EnviroBlend with* Tack or approved equivalent. Use on native grass slopes.

Slopes greater than 3:1 2 acres
Flexterra with tackifier or approved equivalent.

ARTICLE VI. - TREE ORDINANCE

Sec. 28-151. - Generally.

This article shall be known and referred to as the "Tree Ordinance of the City of Hartford".

(Ord. No. 11-11, 3-28-11)

Sec. 28-152. - Purpose.

The City of Hartford is characterized by its rich heritage of trees. Hartford's Trees clean the air, calm traffic, increase property values, reduce storm water run-off, and otherwise enhance the quality of life. The goal of this ordinance is to maintain and grow Hartford's urban forest, maintain Trees in a healthy condition, protect existing Trees, and mitigate losses and damage to Hartford's Trees.

(Ord. No. 11-11, 3-28-11)

Sec. 28-153. - Findings.

In 2007, the City of Hartford, the Knox Parks Foundation, the Connecticut Department of Environmental Protection, and the United States Forestry Service conducted a survey of the City of Hartford's Trees. This survey revealed that the City has approximately four hundred fifty thousand (450,000) Trees that cover about twenty-six (26%) percent of the City's landmass. That is almost four (4) Trees for each resident. Together, they remove two thousand four hundred (2,400) tons of carbon and seventy-three (73) tons of other pollutants from the air each year. Because Hartford has the highest asthma rate in the state, the fact that the removed pollutants include thirty-seven (37) tons of particulate matter, a major asthma trigger, is especially important. Cooling provided by the Trees reduces energy use in the City by one thousand eight hundred (1,800) megawatt hours each year. The estimated replacement value of these Trees is about five hundred ninety million dollars ($590,000,000.00), an amount equal to about twenty-two (22%) percent of the gross value of the municipality's Real Property Grand List. The

largest and oldest Trees, only twelve (12%) percent of the total number of Trees, provide fifty (50%) percent of the total tree canopy cover. Due to their age and vulnerability, it is clear that Hartford's urban forest is in jeopardy if these Trees are not maintained and more Trees are not planted each year.

(Ord. No. 11-11, 3-28-11)

Sec. 28-154. - Definitions.

Alter means to take action by removing branches or by filling, surfacing, grading, compacting, channeling or changing the drainage pattern of the soil surrounding any Tree in a manner that threatens to diminish the vigor of the Tree. The term "alter" does not include normal seasonal pruning/shaping of a Tree necessary for normal growth.

Best Interest is a determination based on reviewing all relevant factors, including but not limited to the preservation of Trees, the impact on the streetscape, the maintenance of an effective Tree canopy, the importance of the particular Tree, the health of the Tree and its impact on safety and the overall impact that the loss of the Tree would have on the City's urban forest.

City Tree means a Public Tree or a Streetscape Tree.

Damage means to act in a manner to jeopardize a Tree's health or cause its appearance to be defaced. Actions that constitute damage include, but are not limited to: posting bills, hanging streamers and/or decorations, driving any objects into a Tree, carving the bark of a Tree, digging/excavating/paving within the Drip Line in a way which impacts the root system, painting a Tree, setting fire to a Tree or allowing harmful substances to come in contact with a Tree.

DBH (diameter at breast height) means the diameter of a Tree at fifty-four (54) inches above grade as indicated by the United States Forest Service method.

Drip Line means a conceptual line along the ground that conforms to the perimeter of the crown of the Tree and projects vertically to the ground.

Grove means a grouping of ten (10) or more Trees, as defined in this Section, located on one quarter (¼) acre or less.

Hazardous Tree means a tree that is likely to create hazardous conditions on roadways or sidewalks or to cause imminent damage to public property, private property or utility wires.

Legacy Tree means any Tree as determined by the Tree Advisory Commission to be of unique and intrinsic value to the general public because of its size, age, historic association, ecological importance or aesthetic value.

Master Tree Plan means a document prepared by the Tree Advisory Commission that shall establish direction for the City's urban forestry program and shall include targets for Tree canopy cover and Tree diversity. It shall also reference standards for safety in Tree care operations, for Tree planting, and for Tree maintenance. It shall also include guidelines for specifications relating to Trees and Tree care and for contract Tree work. In addition, the Master Tree Plan shall outline a broad program for the improvement of the urban forest that may include recommendations for urban forestry activities in specific neighborhoods, along specific streets, and in areas of the City such as Historic Districts. The Master Tree Plan shall also include a plan for management of City-owned woodlands, such as those that exist in City parks. The Master Tree Plan shall be integrative with other City plans and activities. The Master Tree Plan shall incorporate the most recent Tree inventory as conducted by the City

Forester and may, at the discretion of the Tree Advisory Commission, include additional studies of the urban forest.

Public Place means any space owned by the City of Hartford, including property operated or controlled by the Hartford Board of Education, by the Hartford Housing Authority and any space in a City park.

Public Tree means any Tree in a public place.

Remove means to cut down a tree or to take any other action that will cause a Tree to die within a two-year period.

Right-of-way means the area owned by the City that abuts any City street, as shown in the City of Hartford's Engineering Division street line maps.

Streetscape Tree means any Tree on private property with a base that originates in the right-of-way or not more than five (5) feet from the right-of-way and serves as part of the tree line of a street. A Tree originates in the right-of-way if a vertical line from the part of the trunk nearest to the street at a height of fifty-four (54) inches is within the right-of-way.

Super Hazardous Tree is an otherwise Hazardous Tree which has been ordered removed by the City Forester or other assigns of the City of Hartford on an emergency basis because it represents so immediate a hazard to public safety that removal cannot be deferred and the structure cannot be protected, secured, or stabilized by reasonable measures specified by the City Forester. This Article shall not apply to any alteration or pruning that has been ordered by the City Forester or other assigns of the City of Hartford on an emergency basis because the condition represents so immediate a hazard to public safety or structure integrity that alteration cannot be deferred and that such Super Hazardous Tree cannot to protected, secured, or stabilized by reasonable temporary measures specified by the City Forester.

Tree means any living woody, self-supporting plant that has a defined stem(s) with a DBH of at least two (2) inches using the United States Forest Service method of determination.

Tree Inventory means at a minimum a recording of the size, condition, location, and species of all Streetscape Trees and of all planting locations without a Tree that could reasonably accommodate a Streetscape Tree. A Tree Inventory may also include a description of the Tree canopy and a description of the extent and condition of Trees in the City, including those on private property, in parks, and other public areas.

(Ord. No. 11-11, 3-28-11)

Sec. 28-155. - City Forester, roles and responsibilities.

(a) The Director of Public Works in accordance with the provisions of Section 26-11 and Section 26-12 of this Municipal Code shall appoint a City Forester. The City Forester shall in general act under the direction of the Director of Public Works, in reference to the duties placed upon the Department of Parks and Recreation by Section 26-11 and Section 26-12 of the Municipal Code and shall perform such other special duties in reference to Trees, shrubs or vines in highways, public parks and public grounds as may be required of him or her by such Director under the provisions of the Charter and ordinances of the City and the laws of the state. In particular, the City Forester shall have the rights, powers and responsibilities of a Tree Warden as defined in Section 23-59 of the Connecticut General Statutes. The City Forester shall also be advised by the Tree Advisory Commission established in

Section 6 of this article and shall attend all meetings of the Tree Advisory Commission. The City Forester, or his/her designee, shall have the right to determine whether any specific plant be considered a Tree or shrub and whether a Tree is hazardous. He or she shall also have the right to determine the dollar value of any Tree for the purpose of assessment.

(b) Within one hundred eighty (180) days of the effective date of this ordinance, the City Forester shall conduct or cause to be conducted a Tree Inventory. When completed, the inventory shall be available to the public and shall be updated no less than every ten (10) years.

(c) The City Forester shall have the authority to issue citations for violations of this article.

(d) The City Forester shall approve Tree plans for new construction before they are approved by the Planning and Zoning Commission.

(e) Removal of a City Tree shall be permitted only if authorized by the City Forester or his/her designee.

(f) The City Forester shall recommend a budget for expending the annually available funds in the Hartford Tree Account pursuant to Section 28-164 of this article.

(g) The City Forester shall assure that a copy of the alphabetical street list of City rights-of-way or other reference by which this information is named, as maintained by the City of Hartford Engineering Division of the Department of Public Works, is placed on the City's website so as to be easily accessible to property owners and other members of the public.

(Ord. No. 11-11, 3-28-11)

Sec. 28-156. - Tree Advisory Commission.

(a) There is hereby created a Tree Advisory Commission, which shall consist of five (5) ex officio members and five (5) members appointed by the Mayor and approved by the Court of Common Council. The ex officio members shall be the City Forester, the chair of the Parks and Recreation Advisory Commission, the chair of the Public Works, Parks, and Environment Committee of the Court of Common Council, the City Planner, and the Head of Buildings and Grounds for the Hartford Board of Education. The appointed members shall be two (2) persons with established professional competence in a pertinent discipline, such as certified arborists, ornamental horticulturists, and landscape architects and designers, or with a technical background in a related field, and three (3) Hartford residents selected for their interest in the condition of Hartford's urban forest. The City Forester shall be a non-voting member.

(b) The Commission shall meet as needed to diligently conduct its business and shall hold regular meetings no less than once per quarter. A quorum shall be a majority of the voting members.

(c) *Members shall serve without compensation.* Two (2) members will be designated by the Mayor to serve a three-year term, two (2) members to serve a two-year term and one (1) member to serve a one-year term. After initial appointments, all members shall be appointed for three (3) year terms, except that appointments to fill vacancies shall be for unexpired terms only. Members shall serve in their positions until a replacement is appointed.

(d) The duties of the Commission shall include but shall not be limited to: advising the City Forester, the Court of Common Council, and the Mayor on Tree-related issues in the City and promoting awareness of Tree care, Hartford's arboreal heritage, and the benefits of an urban forest.

(e) The Commission shall develop and adopt a Master Tree Plan within eighteen (18) months of the Commission's first meeting. The Commission shall review the Master Tree Plan every five (5) years and shall amend it as needed. The Master Tree Plan shall be consulted by all City Departments subject to the Master Tree Plan in the course of conducting City business.

(f) The Commission shall create an annual "State of the Forest" report about what has occurred in the City's Tree Inventory and urban forest and shall also prepare recommendations of policy and action for the next year. This report may also identify priority locations for planting, so that the City's Tree planting will address any arboreal inequities and will give priority to filling in gaps resulting from the absence of Streetscape Trees. The Commission shall present this report to the Mayor and Court of Common Council for their review and response.

(g) The Commission shall hear and, by majority vote of those present and voting, decide appeals from the City Forester pursuant to Sections 28-159 and 28-160 of this article.

(Ord. No. 11-11, 3-28-11)

Sec. 28-157. - Legacy Tree Program.

(a) The Tree Advisory Commission shall establish a Legacy Tree Program in order to catalog Legacy Trees in the City of Hartford. The public shall be encouraged to give input to the Commission about which Trees should be included in the catalog. The City Forester shall keep a record of all Trees designated as Legacy Trees and their locations.

(b) The Commission shall also select a "City Tree" every three (3) years. This Tree shall be selected due to its uniqueness, age, historical significance, or other distinguishing characteristics.

(Ord. No. 11-11, 3-28-11)

Sec. 28-158. - Planting trees in public places.

To contribute to the urban forest of Hartford, the public shall be encouraged to plant Trees in public places in the City and in areas which fill in gaps in the Tree line in or near the right-of-way. Any organization or person wishing to plant a Tree in a Public Place or a right-of-way must submit to the City Forester the location, species, and size of the proposed Tree(s) and must obtain a permit from the City Forester or his/her designee prior to planting. Once such a Tree is planted in a public place or right-of-way, the Tree shall become the property of the City of Hartford.

(Ord. No. 11-11, 3-28-11)

Sec. 28-159. - Altering or damaging trees in a public place or right-of-way.

(a) Any person wishing to Alter or Damage a City Tree that is subject to subsection (a) of this Section shall apply in writing for a permit to the City Forester prior to taking such action. The City Forester shall determine whether such action is in the best interest of the City's urban forest and shall notify the applicant of the decision by first-class mail within twenty (20) business days of receiving the application.

(b) A person may appeal the decision of the City Forester within forty-five (45) days of the postmarked date of the City Forester's replay in writing to the Tree Advisory Commission.

(c) Any person who violates the provisions of this Section shall be subject to a fine up to two hundred fifty dollars ($250.00) per violation. The City Forester or designee shall have the authority to issue a

citation for violations. All claims regarding citation shall be processed pursuant to Section 1-5 of the Municipal Code. It shall be an affirmative defense that it was necessary to take action without a permit from the City Forester because a super hazard existed such that action was required due to the threat of imminent harm.

(Ord. No. 11-11, 3-28-11)

Sec. 28-160. - Tree removal.

(a) No person shall remove a City Tree, or a Tree on private property with a DBH of thirteen (13) inches or more, or a Grove of Trees without a permit from the City Forester.

(b) Any person wishing to remove a Tree or Grove that is subject to subsection (a) of this Section shall apply in writing for a permit to the City Forester. The City Forester shall determine whether Removal of the Tree or Grove is in the best interest of the City's urban forest and shall notify the applicant of the decision by first-class mail within twenty (20) business days of receiving the application.

(c) There shall be a ten dollar ($10.00) processing fee for each permit application.

(d) A person may appeal the decision of the City Forester to the Tree Advisory Commission. Any person denied may be granted a hearing on the matter before the Tree Advisory Commission. Such person shall file with the City Forester a written petition requesting such hearing and setting forth a brief statement of the grounds therefore, within three (3) business days after the date notice was served. Upon receipt of such petition, the Tree Advisory Commission shall set a time and place for such hearing and shall give the petitioner written notice thereof. At such hearing, the petitioner shall be given the opportunity to be heard and to show why such decision of denial should be overturned. After such hearing, the Tree Advisory Commission shall sustain or overturn the decision of the City Forester, Any and all rights of appeal shall be deemed abandoned if a petition for hearing is not filed with the City Forester within three (3) days after such notice of decision is served.

(e) Any individual who removes a City Tree without a permit shall replace the Tree in accordance with Section 28-162 of this ordinance.

(f) It shall be an affirmative defense that it was necessary to take action without a permit from the City Forester because a super hazard existed such that action was required due to the threat of imminent harm.

(Ord. No. 11-11, 3-28-11)

Sec. 28-161. - Protection during construction.

(a) All Trees on or near the grounds of any construction or excavation project shall be protected using the latest edition of the American National Standards Institute, Inc., Standards for Tree Care Operations—Tree, Shrub, and other Woody Plant Maintenance—Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction). A copy of these standards shall be on hand in the City Forester's office and be made available to the public.

(b) Any person or entity found in violation of subsection (a) of this Section shall be subject to a fine up to two hundred fifty dollars ($250.00) per day that the violation persists. The City Forester or his designee shall have the authority to issue citations. All claims regarding citation shall be processed pursuant to Section 1-5 of the Municipal Code.

(c) Any person or entity found in violation of subsection (a) of this Section for which the City Forester determines there is substantial danger of Damage to a Tree or Grove shall post a five (5) year bond in the amount of the replacement value of such Tree(s). Bond shall be forfeited if the City Forester determines that the Tree is dead or moribund within the five (5) year period.

(Ord. No. 11-11, 3-28-11)

Sec. 28-162. - Tree replacement.

(a) If any person removes any Tree on private land with a DBH of thirteen (13) inches or more that is removed without a permit from the City Forester or any Tree on public land with a DBH of four (4) inches or more, regardless of permission, shall be replaced by the property owner or person responsible for removal. Trees with DBH of four (4) inches or more removed in the course of any development project, public or private, are also subject to replacement at the discretion of the City Forester.

(b) The acceptable methods of replacement are:

(1) Replacement of the Tree with a Tree of equal or greater DBH at the location of the tree being replaced or at a different location identified or approved by the City Forester and to be maintained for at least a period of two (2) years from the date of planting by the owner. The owner shall replace any tree that dies during this time period.

(2) An inch-for-inch replacement of the Tree with a number of replacement Trees with DBH of two (2) inches or more totaling the DBH of the original Tree at a location or locations identified or approved by the City Forester. For example, if a Tree with a DBH of twenty-four (24") inches is removed, it may be replaced with six (6) Trees with DBHs of four (4") inches.

(3) A payment to the Hartford Tree Account, established in Section 28-164 of this ordinance, in the amount of the Tree's assessed value. The assessed value shall be based on the recommendation of the City Forester using as reference the latest revision of The Guide for Plant Appraisal, as published by the International Society of Arboriculture, Urbana, Illinois.

(c) If a Legacy Tree is removed without a permit it shall be replaced by Trees that are equivalent to four (4) times the Legacy Tree's assessed value.

(d) The siting of any replacement tree or trees shall require the approval of the City Forester.

(Ord. No. 11-11, 3-28-11)

Sec. 28-163. - Planting requirement.

(a) All new public and private development project plans shall include plans for Tree planting and protection. No such Tree development project plan may be approved by the Planning and Zoning Commission unless the plan for Tree planting and protection has first been approved by the City Forester.

(b) These public and private development project plans shall require the creation and maintenance of canopy coverage of at least fifty (50%) percent after fifteen (15) years over those areas of the site to be developed that will not have buildings on them. The City Forester may grant variances or exceptions to this rule for extenuating circumstances. In such a case, in lieu of planting new Trees, the City Forester may permit payment at the price of four hundred dollars ($400.00) per Tree not included in the plan that

would otherwise be necessary to achieve the desired canopy cover. The payment in lieu of planting shall be deposited to the Hartford Tree Account.

(c) All new public and private parking lots shall develop plans for Tree planting that will create and maintain a canopy coverage of at least sixty-six (66%) percent after fifteen (15) years over the areas of the lot that do not have buildings on them. The City Forester may grant variances or exceptions to this rule for extenuating circumstances. In such a case, in lieu of planting new Trees, the City Forester may permit payment at the price of four hundred dollars ($400.00) per Tree not included in the plan that would otherwise be necessary to achieve the desired canopy cover. The payment in lieu of planting shall be deposited to the Hartford Tree Account.

(d) Properties out of compliance with their planting plans may be charged eight hundred dollars ($800.00) per Tree for each Tree not planted in accordance with the plan approved by the City Forester and Planning and Zoning Commission. This money shall be deposited in the Hartford Tree Account.

(e) A person may appeal the decision of the City Forester to the Tree Advisory Commission pursuant to the procedure established in Section 28-160(d).

(f) From time to time the Tree Advisory Commission and City Forester shall review the aforementioned fee structure and report any recommendations regarding changes to the fee structure to the Court of Common Council for approval.

(Ord. No. 11-11, 3-28-11)

Sec. 28-164. - Hartford Tree Account.

(a) There is hereby established a Demand Deposit Account known as the Hartford Tree Account. Such Account is established under authority of the General Statutes and pursuant to Section 2-484 for the exclusive purpose of funding activities that implement or promote the purposes of this Article, as expressed in Section 28-152

(b) The principal of the Hartford Tree Account shall consist of the following:

(1) Up to five (5%) percent of the investment income from the Hartford Park's Trust Fund received on an annual basis;

(2) All fines paid pursuant to Sections 28-159 and 28-161, all processing fees paid pursuant to Section 28-160, all payments made pursuant to Section 28-162 and all payments in lieu of planting made pursuant to Section 28-163

(3) All gifts and grants from any source, public or private, made to the City and designated for Trees or improvements to the urban forest;

(4) Any funds from any source designated by the Court of Common Council to be added to the Account; and

(5) All investment income earned by the Account.

(c) Expendable money in the Account may be spent for the purposes authorized by this Section upon recommendation of the Mayor and with the approval of the Court of Common Council. Expenditures may be made as follows:

(1) All moneys received by the Account under subsection (b)(2) of this Section shall be used only for the purchase and planting of Trees.

(2) Any restricted moneys received by the Account shall be expended in accordance with their restrictions.

(3) At least half of the remaining unrestricted funds shall be expended for the purchase and planting of Trees.

(4) All other unrestricted funds may be spent for any activity that is consistent with the purpose of the Account.

(d) Any budget proposed by the Mayor or approved by the Court of Common Council, and any appropriation made for the purchase and planting of Trees, must not be reduced, ratably or otherwise, in consideration of any moneys in the Account. Expenditures from the Account shall add to and not replace budgets and appropriations which also serve the purposes of the Account.

(e) Any remaining investment income shall be held in reserve for future transfer and appropriation.

(Ord. No. 11-11, 3-28-11)

Sec. 28-165. - Cumulative effect and severability.

This Article shall be subject to all applicable State and Federal laws and shall not impede compliance with such laws. The provisions of this Article are in addition to and not in place of any powers, requirements, sanctions or other provisions of State or Federal law. If any provision of this article is held to be invalid by a court of competent jurisdiction, then such provision shall be considered separate and apart from the remaining provisions, which shall remain in full force and effect.

(Ord. No. 11-11, 3-28-11)

Secs. 28-166—28-169. - Reserved.

SECTION 3

GENERAL INFORMATION FOR PREPARATION AND DELIVERY OF A RESPONSE

Rev. 06/04/12

Definitions:

Request for Response (RFR) refers to any form of solicitation the City may use, such as a Request for Bids (RFB), Request for Proposal (RFP), Request for Information (RFI) or Request for Quotation (RFQ).

Candidate or Respondent refers to an individual or company who is considering or has submitted a response to a solicitation. This is also commonly referred to as "bidder."

City refers to the City of Hartford, the Hartford Public Schools and any other governmental entity participating in the RFR process and/or resulting award(s).

Provider refers to the Candidate or Candidates who receive an award and who enter into a contract with the City.

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3.1 HOW TO RESPOND: Supply the required information on and along with the response forms. An officer or explicit agent of your organization must sign the response form and any supplementary

proposal document.

If this request has a "Specification Offered" column opposite the specifications, complete as follows and return these pages with your pricing sheet(s):

In the "specification offered" column type in:

a) "As specified"
b) "Exceeds specifications" - Identify what exceeds the specification and why
c) "Exception to specifications" - Identify the substitute and define its effect

Failure to follow these guidelines may be just cause for rejection of the response.

3.2 QUESTIONS & ADDENDA: Questions related to this project must be received in writing 72 hours in advance of the response submittal deadline. Written questions must be sent via email to the buyer whose name appears on the invitation to respond. Responses shall be in writing and posted in the form of an addendum. Candidates are responsible for obtaining all addenda related to this RFR and thus advised to check for any addenda a minimum of twenty-four hours in advance of the response deadline.

The bids submitted for the work must be based upon the text of this document including the Standard instructions, Special Instructions, Specifications, all Addenda, and any referenced plans, and no oral or informal statement or representation by any representative or employee of the City of Hartford or the Architect shall be considered an amendment to or waiver of any statements in or requirement of such bidding or proposed contract documents and no claim or right of action shall accrue in favor of any respondent as a result of or founded on such oral or informal statements or representations. The City or its agents shall not be responsible for any oral instructions or interpretations given to a Candidate.

Note: All communications related to this project are to be directed to buyer noted on the invitation to respond. Candidates found to be communicating with City or School staff outside of the Procurement Services Unit will have their response rejected.

3.3 QUALIFICATIONS OF CANDIDATES OFFERING A RESPONSE: The City may make such investigations as deemed necessary to determine the ability of the Candidate to perform the work and the degree to which any Candidate meets the criteria for award listed herein. Each Candidate agrees to furnish the City any additional information requested.

3.4 OBLIGATIONS OF THE CANDIDATE: At the time of the opening of proposals, each Candidate will be presumed to be thoroughly familiar with the City's requirements, and the objectives for each element of the project, item or service. A plea of mistake in the accepted response shall not be available to the Candidate for the recovery of the bid surety or as a defense to any action based upon an accepted response.

3.5 NON-DISCRIMINATION: The candidate agrees and warrants that in the performance of the contract such candidate will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental or physical disability, in any manner prohibited by the laws of the United States or of the State of Connecticut.

3.6 AFFIRMATIVE ACTION REQUIREMENTS:

3.6.1 No Contract or Purchase Order, regardless of how procured, shall be awarded to any Person or Candidate that is not an equal opportunity employer. The successful respondent, as a condition of being

awarded this contract shall agree to comply with all contractual Equal Employment Opportunity/Affirmative Action performance requirements as outlined herein.

3.6.2 The successful respondent, as a requirement of final contract execution will additionally agree to comply with the following provisions*:*

a. Submit a report of current company employment statistics on the EEO Certification Form and a copy of the company Affirmative Action / Equal Employment Opportunity Policy Statement, properly signed by Company official on company letterhead, in accordance with paragraph 3.6.3 below.

b. Sign and submit the document entitled "Hartford Affirmative Action Plan / Equal Employment Opportunity Agreement and Affidavit". *(Construction/Infrastructure projects only)*

3.6.3 Candidate's EEO Report: As a condition of doing business with the City the selected respondent must be certified by the City as an Equal Employment Opportunity Employer. Certifications must be renewed annually. Submit completed EEO Certification forms and EEO Policy Statement with your response. To check the current status of your EEO certification contact Aileen Ortiz at 860.757.9784, fax 860.722.6607 or email: ORTIA005@hartford.gov.

3.6.4 The candidate agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated, when employed, without regard to race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental or physical disability. The advertisement of employment opportunities shall be carried out in such manner as not to restrict such employment.

3.6.5 The successful respondent shall agree that neither he/she nor any subcontractors will discharge, expel or otherwise discriminate against any person because he/she has opposed any unfair employment practice or because he/she has filed a complaint or testified or assisted in any proceeding under Section 31-127 of the Connecticut General State Statutes.

3.6.6 *(Construction/Infrastructure projects only)* During the Performance of this contract, the contractor agrees to permit authorized City of Hartford staff to perform on-site project monitoring related to the contractual equal employment opportunity/affirmative action performance requirements. The prime contractor additionally agrees on behalf of his/her company and all subcontractors to submit the following compliance reports, available at http://purchasing.hartford.gov, while performing under this contract:

a. Payroll Certification Form within 10 working days of end of reporting month
b. Minority/Women Business Enterprise (MWBE) Monthly Payment Status Reports
c. Minority/Women Business Enterprise (MWBE) Final Payment Status Reports
d. Monthly Employment Utilization Report
    1. Minimum of 15% of the total project hours by trade shall be allocated to minority workers.
    2. Hartford resident employment goal of 30% by trade.
e. Status reports as to special training and/or employment residency requirements

3.6.7 The successful respondent further agrees that the requirements as noted in paragraphs 3.5 and 3.6 shall likewise apply to all construction sub-contractors.

3.7 RESPONSE DEVELOPMENT: Candidates are responsible for all costs and expenses incurred in the preparation of a response and for any subsequent work on the response that is required by the City of

Hartford. Any submittal is the property of the City of Hartford and will not be returned.

3.8 TIME PROVISIONS: The content of any response submitted is to remain valid and available to the City for ninety (90) days from the day proposals are due.

3.9 CORRECTION OR WITHDRAWAL OF RESPONSES, CANCELLATION OF AWARDS. Correction or withdrawal of inadvertently erroneous bids, including corrections to pricing must be submitted to the Procurement Agent prior to the bid response deadline. Corrections before or after award, or cancellation of awards of Contracts or Purchase Orders based on such mistakes, may also be permitted with the approval, in writing, of the Procurement Agent, otherwise withdrawal of bid by respondent shall be cause for forfeiture of bid surety to the City.

3.10 QUANTITIES AND/OR USAGES: Quantities and/or usages are estimates only and in no way represent a commitment and/or intent to purchase the estimated amount. Actual quantities and delivery locations may vary. The City reserves the right to order all quantities that may be needed, at the contract price, during the contract term regardless of the estimates provided in this RFR.

3.11 ACCEPTABLE BRANDS: The RFR specifications are not intended to limit consideration to the particular service organization or manufacturer from which they were developed. References to brand names or numbers are to be interpreted as establishing a standard of quality, unless specifically limited by the term “no substitute”, otherwise brand names used within these specifications shall be presumed to be followed by the words "or approved equal". Burden of proving a product and/or material as equal to a specific product and/or material by brand name is the responsibility of the Provider. Final determination as to what is an "or equal" product will be made by the Procurement Agent in conjunction with other City staff. The City will award on the basis of the criteria stated herein, and reserves the right to waive or require compliance with any element of the specifications.

3.12 SAMPLES: Samples are furnished free of charge and may be held for comparison with deliveries. Candidate must arrange for their return if desired. Samples are assumed to meet, at a minimum, City specifications for quality. All deliveries shall have at least the same quality as the accepted proposal sample. Latent deficiencies will be remedied by the contractor at no additional cost, or loss of service, to the City.

3.13 SITE INSPECTION: Information contained in these documents is provided in good faith only that all Candidates may have access to the same information utilized by the City, and is not intended as a substitute for personal investigations, interpretations and judgment of the Candidate. As information may be approximated or incomplete, Candidates should conduct a thorough inspection, review of existing conditions/equipment, examination of the site and compare it to the specifications and drawings. Any discrepancies or needs for clarifications must be brought to the attention of the department managing the RFR prior to the bid opening.

Pre-bid / Response conferences are noted on the invitation to respond. Submission of a bid shall be evidence that respondent has examined the site, compared it with the drawings and specifications and satisfied itself of the conditions existing at the site, the storage and handling of materials, and all other matters incidental to the work under this contract. No additional compensation will be allowed for difficulties which the respondent could have discovered or reasonably anticipated prior to bidding.

3.14 CONTRACTING: The City reserves the right to require the successful Candidate to execute a contract in a format supplied by the City. The terms and conditions of the contract to be signed upon the award of the RFR will supersede any inconsistent provision of the RFR documents.

The award of any contract is subject to the following conditions and contingencies:

(1) The approval of such governmental agencies as may be required by law.
(2) The appropriation of adequate funds by the proper agencies.
(3) Compliance with all applicable laws, regulations, ordinances and codes of the United States, the State of Connecticut and the City of Hartford.
(4) The selected Candidate must be current in all tax or any other monetary obligation owed to the City of Hartford.
(5) The selected Candidate must have a current EEO certification on file with the City.

Unless otherwise indicated the duration of the Contract will be one (1) year. Further, Contract terms may be negotiated on award anniversaries. City Ordinance Sec 2-588 (C) allows for a maximum of three Contract extensions provided that the funds are available, approved by the City for this purpose and that the Provider has established a satisfactory performance record.

Notwithstanding the failure of City to exercise any option to renew this contract for an additional year, the Managing Authority reserves the right to unilaterally extend this contract on a month to month basis for a period not to exceed three (3) months under the same terms and conditions applicable to the preceding contract period.

3.15 CONTRACT DOCUMENTS: The Contract documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), this Request for Response (RFR) and its referenced documents, General and Supplementary Conditions, drawings, any Addenda issued, the Contractor's response to the RFR, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a Minor change in the Work issued by the Design Professional on behalf of the City; the Contract Documents do include other documents such as bidding requirements.

3.16 RETAINAGE *(Construction/Infrastructure projects only)***:** When progress payments are being made for items being built or designed, the City may withhold at least 5% of the total project cost, or as otherwise specified in the contract for this project.

3.17 INSURANCE: Refer to the exhibit noted on the Invitation to Respond for specific insurance requirements. List the name and address of the respondent's insurance agent on the response form. The successful candidate shall be required to furnish a Certificate of Insurance (Accord Form), acceptable to the City, within ten (10) days from notice of award and must name the City as an additional insured on the face of the document. The insurance certificate and coverage requested must be updated and kept current throughout the life of the contract, including any extensions. If at any time during the term of the contract or any extension thereof, any required policies of insurance should renew, expire, or be cancelled, it will be the responsibility of the Provider to furnish to the City a Certificate of Insurance indicating renewal or an acceptable replacement of the expiring policy prior to the expiration or cancellation, so that there will be no lapse in any coverage. The candidate shall obtain and maintain such required insurance at its own cost and expense.

3.18 BID BONDS: A Bid bond, cashiers or certified check may be required with your response. The City of Hartford provides contractors with the option of submitting an electronic Bid Bond through the Surety2000 website. Surety 2000 is an Internet-based surety processing, verification and security system, developed in cooperation with the surety industry. You may contact Surety 2000 at 1-800-660-3263 or www.surety2000.com, for more information.

Certified checks will be returned to all unsuccessful Candidates upon the awarding of the contract. If your response is not accompanied by a bond, certified check or proof that a valid bond has been obtained at the RFR opening it may be rejected.

If you manage a ***small business*** and have difficulty obtaining bonds help is available from the Small Business Administration (SBA) through "The Surety Bond Guarantee Program. For more information go to www.sba.gov, choose "Services." Then select "Financial Assistance" and click on "Surety Bond."

3.19 PERFORMANCE BOND AND PAYMENT BOND: If requested, the successful contractor will be required to submit a Performance Bond and Payment (Labor & Material) Bond in the amount of 100% of contract award within 10 days of award if the contract value exceeds $50,000. Said bonds shall be issued by an insurance company and said surety companies must be listed on the current Federal Register, licensed in the State of Connecticut with an underwriting limitation exceeding the value of the project with no more than 5% of capital in surplus tied to any one risk. Banks must have a branch office in Connecticut with insurance provided by the FDIC. The bonds must be signed by an officer of the company and of the surety company above their official titles and their corporate seals must be affixed over the signatures.

Indicate the cost for these bonds, to be added to the contract sum, on the response form.

3.20 PREVAILING WAGES *(Construction/Infrastructure projects only)***:** Pursuant to Section 2-559 (B), Required Provisions. Each Agreement for the construction, remodeling or repair of any Infrastructure Facilities shall contain both of the following provisions:

(1) "The wages paid to any mechanic, laborer or workman employed upon the work herein contracted to be done shall be at a rate equal to the prevailing wage rate in the State of Connecticut and or federal government, whichever is applicable, for the same work in the same trade or occupation."

(2) "Each contractor and subcontractor, or an authorized officer or employee, responsible for supervision of the payment of wages shall submit, on a weekly basis within seven (7) days after the regular payment date of the payroll period, to the Procurement Services Unit, a "Weekly Certified Statement of Compliance." Due and timely compliance with this provision shall be a condition precedent to the approval and transmittal of the next and succeeding payments by the city or its authorized officers or agents to the contractor under the terms of this agreement."

3.21 SUBCONTRACTORS: The respondent shall not subcontract any portion of the project to be performed unless the prior consent of the City is given for both the work to be subcontracted and the subcontractor to perform the same. The terms and conditions of the underlying contract between the City and Contractor will become part and parcel of the terms and conditions of each subcontract. Respondents are required to provide subcontractor information in the space provided in 1.4 "Subcontractor Utilization" of the response forms. Complete a separate form for the Base Bid and each Alternate. MWBE's must certified with the City of Hartford at the time of response submission.

3.22 MINORITY BUSINESS UTILIZATION *(Construction/Infrastructure projects only)***:** Respondents are required to set-aside for Minority Businesses 15% of the construction work. Respondents are encouraged to exceed the set-aside requirement specified. The City's Minority Business listing as further described in paragraph 3.23.3 shall be used by respondents in selecting minority business contractors.

The sum of all minority business subcontracts shall be equal to or greater than 15% regardless of how the bid is awarded (base only or base plus one or more alternates). Failure to comply with the required percentage of minority business utilization will be cause for rejection of bid.

3.22.1 City Certification Required

Respondents shall utilize Minority subcontractors who hold a current MWBE certificate with the City of Hartford at the time of response submission. Certifications by any other government entity shall not be sufficient to qualify the subcontractor to participate in the City of Hartford's minority business utilization preference program. In selecting its minority subcontractors, respondent is cautioned to seek documented proof that its subcontractors hold valid certification by the City. Failure to identify City certified Minority Business subcontractors will be cause for rejection of bid.

3.22.2 Percentage of Work to be Performed

Designated MWBE's shall perform at least 70% of the work with their own forces and as part of their own operations excluding the manufacture or purchase of proprietary products.

3.22.3 Minority Business Listing

A listing of Minority Businesses holding certification by the City of Hartford is available at http://purchasing.hartford.gov or in the Procurement Services Unit, Room 100, 550 Main Street, Hartford, CT 06103. The City's listing of minority businesses is comprised of companies whereby at least 51% of the company is owned and operated by one or more of the following group persons: Black Americans, Hispanic Americans, Women, Asian Pacific Americans, Pacific Islanders, American Indians and descendants from the Iberian Peninsula. It should be understood that such listings are made available to assist respondents in satisfying bid requirements; however, respondent's selection of a subcontractor is its sole responsibility and all work performed under the contract shall be respondent's sole responsibility. The City does not sponsor or recommend the selection of any one vendor. Certification by the City of Hartford as a minority business does not imply that the business is qualified to perform the work specified in this bid. The City reserves the right to request alternate minority subcontractors for whatever reason.

3.22.4 Proof of Minority Business Utilization Required

Prior to execution of contract, the successful respondent shall be required to file with the City Engineer the actual form of subcontract with subcontractor(s) named in at least the minimum dollar value as stated in the "Subcontractor Utilization" form. The subcontract shall state the percentage of work which will be performed by the MWBE with its own forces and as part of its operation. Failure to comply with proof of subcontract within 10 days of notification may result in the rejection of bid and may be cause for forfeiture of respondents' bid surety. Further, the City reserves the right to monitor the performance and payment of such subcontracts; therefore, upon request by the City, the successful respondent shall be required to furnish proof of payment to its subcontractors. Failure to comply with such monitoring requirements within ten days of written request will result in withholding of payment to respondent.

3.22.5 Changes in Subcontractors after Award

The successful respondent may not change subcontractor(s) after the contract has been let unless and until it has received written approval from the City of Hartford. Any such approval shall be based upon a written request by the Contractor or City, which details performance and/or other issues related to the subcontractor(s).

3.23 SET-ASIDE PROGRAM: If this RFR is set-aside for award to a small, minority or women owned business enterprise you must receive a City of Hartford SC/MWBE certification prior to submission of bid response. This program is described in Sec. 2-660 of the Hartford Municipal Code.

3.24 CITY-BASED SMALL CONTRACTOR PREFERENCE: Any City-based SC/MWBE Certified Small Business which has submitted a bid not more than fifteen (15) percent higher than the low bid, provided such

respondent agrees to accept the award at the amount of the low bid, shall be selected as the lowest responsible candidate. If more than one City-based SC/MWBE Certified Small Business has submitted bids not more than fifteen (15) percent higher than the low bid, the City shall select the lowest Responsible candidate among such respondents which submitted the lowest bid.

3.25 CRITERIA FOR AWARD: This Request for Response does not necessarily contemplate an award based solely on price. Rather, the City reserves its rights to accept or reject any or all responses or any portion thereof that it may determine to be in its own best interests, for whatever reason.

3.26 NOTICE OF AWARD: The selected vendor will be provided with a written Notice of Award which shall be contingent upon the submission by the respondent of all documents required of the successful candidate, including, but not limited to, proper insurance certificates, performance and payment bonds, verification of MWBE percentage contribution to the work and execution of contract within 10 days of the notice of award.

3.27 PERFORMANCE EVALUATION: The Contractor understands that during the course of and at the conclusion of the project that the City will evaluate his/her overall performance. Based on information gathered from the City's project management team, the Procurement Agent will assess factors including, but not limited to, quality of work or service, completion record, job supervision, working relationship with other providers, bills for extras, organization, cooperation, worksite cleanliness and compliance with City MBE requirements. This evaluation will be considered in the issuance of future awards. The contractor further understands and agrees that this record will be available for public scrutiny for a minimum of two years.

END OF SECTION

LABOR COMPLIANCE

Project: Keney Golf Course Renovation

Minimum Rates and Classifications
for Heavy/Highway Construction

Connecticut Department of Labor
Wage and Workplace Standards Division

ID#: **H** 18818

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: DPW14-20
FAP Number:
Project: Keney Golf Course Renovation

Project Town: Hartford
State Number:

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	27.06
2) Carpenters, Piledrivermen	30.45	21.65

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2a) Diver Tenders	30.45	21.65
3) Divers	38.91	21.65
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	44.25	17.75
4a) Painters: Brush and Roller	30.62	17.75
4b) Painters: Spray Only	33.62	17.75
4c) Painters: Steel Only	32.62	17.75
4d) Painters: Blast and Spray	33.62	17.75

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4e) Painters: Tanks, Tower and Swing	32.62	17.75
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	37.60	22.22+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	33.50	28.98
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	39.31	26.27
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	26.40	17.15
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	26.65	17.15

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Project: Keney Golf Course Renovation

10) Group 3: Pipelayers	26.90	17.15
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	26.90	17.15
12) Group 5: Toxic waste removal (non-mechanical systems)	28.40	17.15
13) Group 6: Blasters	28.15	17.15
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	27.40	17.15
Group 8: Traffic control signalmen	16.00	17.15

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	17.15 + a
13b) Brakemen, Trackmen	30.37	17.15 + a
14) Concrete Workers, Form Movers, and Strippers	30.37	17.15 + a
15) Form Erectors	30.68	17.15 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	17.15 + a
17) Laborers Topside, Cage Tenders, Bellman	30.26	17.15 + a

As of: Monday, March 03, 2014

18) Miners	31.28	17.15 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	37.41	17.15 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	37.22	17.15 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	35.35	17.15 + a
21) Mucking Machine Operator	37.97	17.15 + a
----TRUCK DRIVERS----(*see note below)		

As of: Monday, March 03, 2014

Two axle trucks	27.88	18.27 + a
Three axle trucks; two axle ready mix	27.98	18.27 + a
Three axle ready mix	28.03	18.27 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.08	18.27 + a
Four axle ready-mix	28.13	18.27 + a
Heavy duty trailer (40 tons and over)	28.33	18.27 + a
Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.13	18.27 + a

Project: Keney Golf Course Renovation

----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	36.05	21.55 + a
Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer). (Trade License Required)	35.73	21.55 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	34.99	21.55 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	34.60	21.55 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	34.01	21.55 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	34.01	21.55 + a

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Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	33.70	21.55 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	33.36	21.55 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	32.96	21.55 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	32.53	21.55 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	30.49	21.55 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	30.49	21.55 + a
Group 12: Wellpoint Operator.	30.43	21.55 + a

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Group 13: Compressor Battery Operator.	29.85	21.55 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	28.71	21.55 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	28.30	21.55 + a
Group 16: Maintenance Engineer/Oiler	27.65	21.55 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	31.96	21.55 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	29.54	21.55 + a

**NOTE: SEE BELOW

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----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Dynamite Man	44.36	3% + 13.70
21) Heavy Equipment Operator	39.92	3% + 13.70
22) Equipment Operator, Tractor Trailer Driver, Material Men	37.71	3% + 13.70
23) Driver Groundmen	33.27	3% + 13.70

----LINE CONSTRUCTION----

24) Driver Groundmen	30.92	6.5% + 9.70

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25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

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Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

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Project: Keney Golf Course Renovation

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

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Project: Keney Golf Course Renovation

Minimum Rates and Classifications for Heavy/Highway Construction

Connecticut Department of Labor
Wage and Workplace Standards Division

ID#: **H** 18819

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: DPW14-20
Project Town: Windsor
FAP Number:
State Number:
Project: Keney Golf Course Renovation

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	27.06
2) Carpenters, Piledrivermen	30.45	21.65

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2a) Diver Tenders	30.45	21.65
3) Divers	38.91	21.65
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	44.25	17.75
4a) Painters: Brush and Roller	30.62	17.75
4b) Painters: Spray Only	33.62	17.75
4c) Painters: Steel Only	32.62	17.75
4d) Painters: Blast and Spray	33.62	17.75

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Project: Keney Golf Course Renovation

4e) Painters: Tanks, Tower and Swing	32.62	17.75
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	37.60	22.22+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	33.50	28.98
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	39.31	26.27
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	26.40	17.15
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	26.65	17.15

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

10) Group 3: Pipelayers	26.90	17.15
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	26.90	17.15
12) Group 5: Toxic waste removal (non-mechanical systems)	28.40	17.15
13) Group 6: Blasters	28.15	17.15
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	27.40	17.15
Group 8: Traffic control signalmen	16.00	17.15

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	17.15 + a
13b) Brakemen, Trackmen	30.37	17.15 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	30.37	17.15 + a
15) Form Erectors	30.68	17.15 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	17.15 + a

As of: Monday, March 03, 2014

17) Laborers Topside, Cage Tenders, Bellman	30.26	17.15 + a
18) Miners	31.28	17.15 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	37.41	17.15 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	37.22	17.15 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	35.35	17.15 + a
21) Mucking Machine Operator	37.97	17.15 + a

Project: Keney Golf Course Renovation

----TRUCK DRIVERS----(*see note below)

Two axle trucks	27.88	18.27 + a
Three axle trucks; two axle ready mix	27.98	18.27 + a
Three axle ready mix	28.03	18.27 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.08	18.27 + a
Four axle ready-mix	28.13	18.27 + a
Heavy duty trailer (40 tons and over)	28.33	18.27 + a

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.13	18.27 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	36.05	21.55 + a
Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer). (Trade License Required)	35.73	21.55 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	34.99	21.55 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	34.60	21.55 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	34.01	21.55 + a

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	34.01	21.55 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	33.70	21.55 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	33.36	21.55 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	32.96	21.55 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	32.53	21.55 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	30.49	21.55 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	30.49	21.55 + a

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

Group 12: Wellpoint Operator.	30.43	21.55 + a
Group 13: Compressor Battery Operator.	29.85	21.55 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	28.71	21.55 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	28.30	21.55 + a
Group 16: Maintenance Engineer/Oiler	27.65	21.55 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	31.96	21.55 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	29.54	21.55 + a

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Dynamite Man	44.36	3% + 13.70
21) Heavy Equipment Operator	39.92	3% + 13.70
22) Equipment Operator, Tractor Trailer Driver, Material Men	37.71	3% + 13.70
23) Driver Groundmen	33.27	3% + 13.70

----LINE CONSTRUCTION----

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

As of: Monday, March 03, 2014

Project: Keney Golf Course Renovation

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: Monday, March 03, 2014

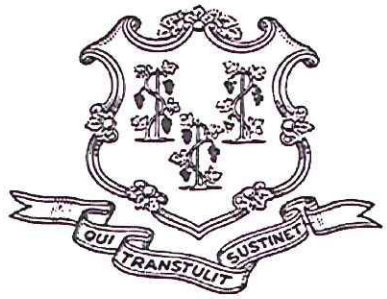
Employee Complaint Forms
Employer Forms
Laws/Legislation
Manuals and Publications
Compliance Assistance
Prevailing Wages
Standard Wage Rates
Workplace Standards
Employment of Minors
FMLA
Joint Enforcement Commission For Worker Misclassification (JEC)
Stop Work Orders
Reports of Activities
FAQs

Contact Us

PREVAILING WAGE BID PACKAGE

- Prevailing Wage Law Poster (PDF, 97KB)
- Section 31-53b: Construction safety and Health Course. Proof of completion required for employees on public building projects. (PDF, 10KB)
  - Informational Bulletin - The 10-Hour OSHA Construction Safety and Health Course (PDF, 20KB)
- Notice For All Mason Contractors (PDF, 5KB)
- CT General Statute 31-55a
- Contracting Agency Certification Form (PDF, 89KB)
- Contractor's Wage Certification Form (PDF, 11KB)
- Payroll Certification - Public Works Projects
- Occupational Classification Bulletin
- Footnotes (Rev. 07/13) (PDF, 93KB)

200 Folly Brook Boulevard, Wethersfield, CT 06109 / Phone: 860-263-6000



THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

If you have QUESTIONS regarding your wages
CALL (860) 263-6790

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine
Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least $100,000)

(1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);

(2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;

(3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least $100,000;

(4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;

(5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/otc/training/edcenters/fact_sheet.html;

(6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;

(7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;

(8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;

(9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

(10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;

(11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;

(12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;

(13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;

(14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and

(15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.

(16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNIG THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.

- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions,Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the ***contractor's*** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.

- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

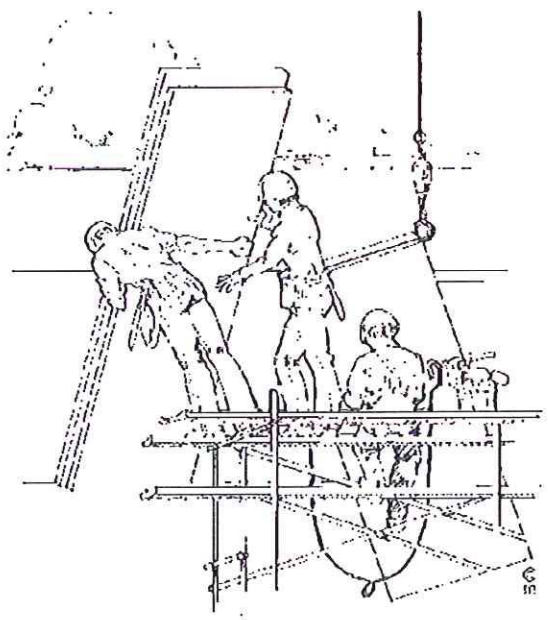
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached "Contracting Agency Certification Form" to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

✎ Inquiries can be directed to (860)263-6543.



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative — title

for _____, located at _____,
contracting agency — address

do hereby certify that the total dollar amount of work to be done in connection with

_____, located at _____,
project name and number — address

shall be $_____, which includes all work, regardless of whether such project

consists of one or more contracts.

CONTRACTOR INFORMATION

Name:_____

Address:_____
Authorized Representative:_____
Approximate Starting Date: _____

Approximate Completion Date:_____

_____ _____
Signature — Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

Construction Manager at Risk/General Contractor/Prime Contractor

I,_____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

_____
Signed

Subscribed and sworn to before me this _____ day of _____,_____.

_____
Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

CERTIFIED PAYROLL FORM WWS - CPI

Employee Complaint Forms
Employer Forms
Laws/Legislation
Manuals and Publications
Compliance Assistance
Prevailing Wages
Standard Wage Rates
Workplace Standards
Employment of Minors
FMLA
Joint Enforcement Commission For Worker Misclassification (JEC)
Stop Work Orders
Reports of Activities

FAQs

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.

Note: Once you have downloaded these forms and are ready to print them out, set the print function on your PC to the horizontal print orientation.

Note2: Please download both the Payroll Certification for Public Works Projects **and** the Certified Statement of Compliance for a complete package. The Certified Statement of Compliance appears on the same page as the Fringe Benefits Explanation page.

Announcement: The Certified Payroll Form WWS-CPI can now be completed on-line!

- Certified Payroll Form WWS-CPI (PDF, 727KB)
- Sample Completed Form (PDF, 101KB)

Contact Us

200 Folly Brook Boulevard, Wethersfield, CT 06109 / Phone: 860-263-6000

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Connecticut Department of Labor
Wage and Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

CONTRACTOR NAME AND ADDRESS:	SUBCONTRACTOR NAME & ADDRESS	WORKER'S COMPENSATION INSURANCE CARRIER POLICY # EFFECTIVE DATE: EXPIRATION DATE:

PAYROLL NUMBER	Week-Ending Date	PROJECT NAME & ADDRESS

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE S HOURS WORKED EACH DAY	M	T	W	TH	F	S	Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

12/9/2013 *IF REQUIRED
WWS-CP1 *SEE REVERSE SIDE PAGE NUMBER _____ OF

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care _____ 4) Disability_____

2) Pension or retirement _____ 5) Vacation, holiday_____

3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____of _____, (hereafter known as

Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such person is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

_____ _____ _____

(Signature) (Title) Submitted on (Date)

*****THIS IS A PUBLIC DOCUMENT*****
*****DO NOT INCLUDE SOCIAL SECURITY NUMBERS*****

Weekly Payroll Certification For
Public Works Projects (Continued)

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Week-Ending Date:
Contractor or Subcontractor Business Name:

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE S	M	T	W	TH	F	S	Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

HOURS WORKED EACH DAY

*IF REQUIRED

NOTICE: THIS PAGE MUST BE ACCOMPANIED BY A COVER PAGE (FORM # WWS-CP1)

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Connecticut Department of Labor
Wage and Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

CONTRACTOR NAME AND ADDRESS:
Landon Corporation, 15 Connecticut Avenue, Northford, CT 06472

SUBCONTRACTOR NAME & ADDRESS
XYZ Corporation
2 Main Street
Yantic, CT 06389

WORKER'S COMPENSATION INSURANCE CARRIER
Travelers Insurance Company
POLICY # #BAC8888928
EFFECTIVE DATE: 1/1/09
EXPIRATION DATE: 12/31/09

PAYROLL NUMBER: 1
Week-Ending Date: 9/26/09
PROJECT NAME & ADDRESS: DOT 105-296, Route 82

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION / Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE: S 20	M 21	T 22	W 23	TH 24	F 25	S 26	Total ST Hours / Total O/T Hours (HOURS WORKED EACH DAY)	BASE HOURLY RATE / TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS: FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING	LIST OTHER	GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY
Robert Craft 81 Maple Street Willimantic, CT 06226		M/C	Electrical Lineman E-1 1234567 Owner OSHA 123456		8	8	8	8	8		S-TIME 40 O-TIME	$ 30.75 Base Rate $ 8.82 Cash Fringe	1. $ 5.80 2. $ 3. $ 2.01 4. $ 5. $ 6. $	$1,582.80				P-xxxx	$1,582.80	#123 $ xxx.xx
Ronald Jones 212 Elm Street Norwich, CT 06360	65%	M/B	Electrical Apprentice OSHA 234567		8	8	8	8	8		S-TIME 40 O-TIME	$ 19.99 Base Rate $ 16.63 Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $	$1,464.80	xx.xx	xxx.xx	xx.xx	G-xxx	$1,464.80	#124 $xxx.xx
Franklin T. Smith 234 Washington Rd. New London, CT 06320 SECTION B		M/H	Project Manager			8					S-TIME 8 O-TIME	$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $	$1,500.00	xx.xx	xx.xx	xx.xx	M-xx.x		#125 xxx.xx
											S-TIME O-TIME	$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $							

7/13/2009
WWS-CP1

*IF REQUIRED

*SEE REVERSE SIDE

PAGE NUMBER 1 OF 2

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care Blue Cross 4) Disability_____

2) Pension or retirement _____ 5) Vacation, holiday_____

3) Life Insurance Utopia 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of 9/26/09,

I, Robert Craft of XYZ Corporation, (hereafter known as

Employer) in my capacity as Owner (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such employee of the Employer is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such employee's name first appears.

Robert Craft (Signature) owner (Title) 10/2/09 Submitted on (Date)

Section B: Applies to CONNDOT Projects ONLY

That pursuant to CONNDOT contract requirements for reporting purposes only, all employees listed under Section B who performed work on this project are not covered under the prevailing wage requirements defined in Connecticut General Statutes Section 31-53.

Robert Craft (Signature) owner (Title) 10/2/09 Submitted on (Date)

Note: CTDOL will assume all hours worked were performed under Section A unless clearly delineated as Section B WWS-CP1 as such. Should an employee perform work under both Section A and Section B, the hours worked and wages paid must be segregated for reporting purposes.

*****THIS IS A PUBLIC DOCUMENT*****

*****DO NOT INCLUDE SOCIAL SECURITY NUMBERS*****

Employee Complaint Forms
Employer Forms
Laws/Legislation
Manuals and Publications
Compliance Assistance
Prevailing Wages
Standard Wage Rates
Workplace Standards
Employment of Minors
FMLA
Joint Enforcement Commission For Worker Misclassification (JEC)
Stop Work Orders
Reports of Activities
FAQs

Contact Us

OCCUPATIONAL CLASSIFICATION BULLETIN

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53.

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**
  - Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.
- **ASBESTOS INSULATOR**
  - Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.
- **BOILERMAKERS**
  - Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**
  - Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.
- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**
  - Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.
- **CLEANING LABORER**
  - The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification.*
- **DELIVERY PERSONNEL**
  - If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.
  - An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer/tradesman and not a delivery personnel.
- **ELECTRICIANS**
  - Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ***License required per Connecticut General Statutes: E 1 2 L 5 6 C 5 6 T 1 2 L 1 2 V 1 2 7 8 9**

General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.

- **ELEVATOR CONSTRUCTORS**
  - Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ***License required by Connecticut General Statutes: R-1,2,5,6.**
- **FORK LIFT OPERATOR**
  - Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.
  - Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.
- **GLAZIERS**
  - Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce.
- **IRONWORKERS**
  - Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.
- **INSULATOR**
  - Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.
- **LABORERS**
  - Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.
- **PAINTERS**

- Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hanging+ for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**
  - Painter's Rate
    1. Removal of lead paint from bridges.
    2. Removal of lead paint as preparation of any surface to be repainted.
    3. Where removal is on a Demolition project prior to reconstruction.
  - Laborer's Rate
    1. Removal of lead paint from any surface NOT to be repainted.
    2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**
  - Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ***License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**
  - ates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ***License required, crane operators only, per Connecticut General Statutes.**

- **ROOFERS**
  - Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (tear-off and/or removal of any type of roofing and/or clean-up of any and all areas where a roof is to be relaid)

- **SHEETMETAL WORKERS**
  - Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, wall panel siding, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and

composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Insulated metal and insulated composite panels are still installed by the Iron Worker. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers.

- **SPRINKLER FITTERS**
  - Installation, alteration, maintenance and repair of fire protection sprinkler systems. ***License required per Connecticut General Statutes: F-1,2,3,4.**
- **TILE MARBLE AND TERRAZZO FINISHERS**
  - Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.
- **TRUCK DRIVERS**
  - **Definitions:**
    - 1) "Site of the work" (29 Code of Federal Regulations (CFR) 5.2(l)(b) is the physical place or places where the building or work called for in the contract will remain and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contact or project;
      - (a) Except as provided in paragraph (l) (3) of this section, job headquarters, tool yards, batch plants, borrow pits, etc. are part of the "site of the work"; provided they are dedicated exclusively, or nearly so, to the performance of the contract or project, and provided they are adjacent to "the site of work" as defined in paragraph (e)(1) of this section;
      - (b) Not included in the "site of the work" are permanent home offices, branch plant establishments, fabrication plants, tool yards etc, of a contractor or subcontractor whose location and continuance in operation are determined wholly without regard to a particular State or political subdivision contract or uncertain and indefinite periods of time involved of a few seconds or minutes duration and where the failure to count such time is due to consideration justified by industrial realities (29 CFR 785.47)
    - 2) "Engaged to wait" is waiting time that belongs to and is controlled by the employer which is an integral part of the job and is therefore compensable as hours worked. (29 CFR 785.15)
    - 3) "Waiting to be engaged" is waiting time that an employee can use effectively for their own purpose and is not compensable as hours worked. (29 CFR 785.16)
    - 4) "De Minimus" is a rule that recognizes that unsubstantial or insignificant periods of time which cannot as a practical administrative matter be precisely recorded for payroll purposes, may be disregarded. This rule applies only where there are uncertain and indefinite periods of time involved of a short duration and where the failure to count such time is due to consideration justified by worksite realities. For example, with respect to truck

drivers on prevailing wage sites, this is typically less than 15 minutes at a time.

- **Coverage of Truck Drivers on State or Political subdivision Prevailing Wage Projects**
  - Truck drivers **are covered** for payroll purposes under the following conditions:
    - Truck Drivers for time spent working on the site of the work.
    - Truck Drivers for time spent loading and/or unloading materials and supplies on the site of the work, if such time is not de minimus
    - Truck drivers transporting materials or supplies between a facility that is deemed part of the site of the work and the actual construction site.
    - Truck drivers transporting portions of the building or work between a site established specifically for the performance of the contract or project where a significant portion of such building or work is constructed and the physical places where the building or work outlined in the contract will remain.

    For example: Truck drivers delivering asphalt are covered under prevailing wage while" engaged to wait" on the site and when directly involved in the paving operation, provided the total time is not "de minimus"

  - Truck Drivers **are not** covered in the following instances:
    - Material delivery truck drivers while off "the site of the work"
    - Truck Drivers traveling between a prevailing wage job and a commercial supply facility while they are off the "site of the work"
    - Truck drivers whose time spent on the "site of the work" is de minimus, such as under 15 minutes at a time, merely to drop off materials or supplies, including asphalt.

    These guidelines are similar to U.S. Labor Department policies. The application of these guidelines may be subject to review based on factual considerations on a case by case basis.

    For example:

    - Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
    - Hauling material off site is not covered provided they are not dumping it at a location outlined above.
    - Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

Any questions regarding the proper classification should be directed to:

Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.

b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.