SECTION 281608 - TAUT WIRE FENCE AND ALARM SYSTEM

Use this section in conjunction with section 281603.

1. GENERAL
   * + 1. RELATED WORK SPECIFIED ELSEWHERE
          1. Video Training Programs: Section 017900.
          2. Lightning Protection System For Taut Wire Fence: Section 281604.
          3. Perimeter Security Multiplex System: Section 281603.
       2. ALLOWANCES
          1. An allowance for the Work of this Section is specified in Section 012100.
       3. SYSTEM DESCRIPTION
          1. The taut wire fence and alarm system shall operate as a physical barrier to escape attempts and as a zoned, automatic, supervised, detection and alarm system integrated with the perimeter security multiplex system (Section 281603) to alert security personnel of an attempted breach of the perimeter security fence.
          2. The physical barrier consists of:

Several taut (movement transfer) wires stretched between anchor posts and supported by a number of slider posts.

A buried chain link fabric extending from bottom rail to 2'-0” below grade.

* + - * 1. Climbing over the wires, spreading them apart or cutting the wires causes an alarm condition:

When force is applied to the taut wires, they increase in length, producing an equivalent movement in the direction of a sensor post. A sensor detects the movement, and after determining that the disturbance is an escape attempt signals an alarm condition.

Deflection force of more than 25 Kg (55 lbs) will activate the alarm.

Wire deflection not to exceed 3 1/2 inches per wire for alarm.

* + - * 1. The alarm condition is transmitted to the perimeter security multiplex system (Section 281603).
        2. Any zone may be placed in access mode at the perimeter security console (Section 281603), but will signal an alarm condition if circuit supervisory limits are exceeded or if any tamper switches are activated.
        3. Various colored lamps and audible alarm (with silencing switch) operate in conjunction with zoning, trouble access and alarm to indicate status of system (Map display - See Section 281603).
        4. Supervision of the system causes a supervision alarm to signal if:

Sensor circuitry is disturbed (opening, shorting or grounding).

Tamper switches are activated.

* + - * 1. The location of any point at which an attempt is made to tamper with the system is identified.
        2. Failure of the A.C. operating power automatically transfers the system to the secondary standby power supply (batteries). System operates under maximum normal load for 8 hours at 70 degrees F, or 4 hours at minus 30 degrees F.
        3. The taut wire fence and alarm system interfaced with the taut wire control unit shall operate as a stand alone system in the event of failure of the perimeter security multiplex system monitor and control unit (PSCPU).
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.
         5. Submittals Package: Submit the shop drawings, product data, samples, and quality control submittals specified below at the same time as a package.
         6. Shop Drawings:

Composite wiring and/or schematic diagrams of the complete system as proposed to be installed (standard diagrams will not be accepted).

* + - * 1. Product Data:

Catalog sheets, specifications and installation instructions.

Bill of materials.

Detailed description of system operation (format similar to SYSTEM DESCRIPTION).

Total electrical load of the complete system in supervisory and alarm conditions.

Name, address and telephone number of nearest fully equipped service organization.

* + - * 1. Samples: One 3 foot long piece of barbed movement transfer wire.
        2. Quality Control Submittals:

Installers' Qualifications Data: Include the following for each person who will be performing the Work:

Name.

Employers name, business address and telephone number.

Name and address of the required number of similar projects worked on which meet the experience criteria.

Company Field Advisor Data: Include:

Name, business address and telephone number of Company Field Advisor secured for the required services.

Certified statement from the Company listing the qualifications of the Company Field Advisor.

Services and each product for which authorization is given by the Company, listed specifically for this project.

* + - * 1. Contract Closeout Submittals:

Test Report: System acceptance test report.

Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.

Operation and Maintenance Data:

Deliver 2 copies, covering the installed products, to the Director's Representative. Include:

Operation and maintenance data for each product.

Complete point to point wiring diagrams of entire system as installed. Number all conductors and show all terminations and splices. (Numbers shall correspond to numbered tags installed on each conductor.)

Name, address, and telephone number of nearest fully equipped service organization.

* + - 1. QUALITY ASSURANCE
         1. Installers' Qualifications: The persons installing the Work of this Section and their supervisor shall be personally experienced in security systems and shall have been engaged in the installation of security systems for a minimum of 3 years.

Furnish to the Director the names and addresses of 5 similar projects which the foregoing people have worked on during the past 2 years.

* + - * 1. Source Quality Control: The Company producing the system shall have test facilities available which can demonstrate that the proposed system meets contract requirements.
        2. Equipment Qualifications For Products Other Than Those Specified:

At the time of submission provide written notice to the Director of the intent to propose an “or equal” for products other than those specified. Make the “or equal” submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.

If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.

Make arrangements with the owners of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.

Only references from the actual owner or owner’s representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.

Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.

The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.

Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.

Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

* + - * 1. Company Field Advisor: Secure the services of Company Field Advisor for a minimum of 80 working hours for the following:

Edit number of hours to suit.

Render advice regarding installation and final adjustment of the system.

Witness final systems test and certify with an affidavit that the system is installed in accordance with the contract documents and is operating properly.

Train facility maintenance personnel in operation and routine maintenance of the system (minimum of 16 hours).

Train facility security personnel in operation of the system (minimum four 2 hour sessions).

Explain available service programs to facility supervisory personnel.

* + - * 1. Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed system.
      1. PROJECT CONDITIONS
         1. The system shall meet all requirements at the following ambient temperatures and humidity (actual site conditions):

Maximum ambient temperature: 110 degrees F.

Minimum ambient temperature: -30 degrees F.

Relative humidity: 15 percent to 100 percent.

Edit temperature and humidity to suit.

* + - 1. MAINTENANCE
         1. Spare Parts:

Thirty AVP-1 sensor switches (2 wire).

Three DTR-2000 vertical sensor posts with outriggers including sensors, tamper switch, page system, all hardware.

Three DTR-2000 anchor posts with outriggers including all breakway strips and hardware.

Three DTR-2000 slider posts with outriggers including spirals, spiral bars and all hardware.

One reel of 5000 feet of barbed, movement transfer wire.

One hundred breakway connecting strips.

One hundred tensioners.

One hundred link rods.

Two end-of-line modules.

One dynamometer (in-lb).

Change quantities to suit.

1. PRODUCTS
   * + 1. TAUT WIRE FENCE AND ALARM SYSTEM
          1. Israel Aircraft Industries Ltd.'s DTR-2000 Intrusion Detection System, with:

Note: Distributed by Safeguard Technology Inc.,   
280 Huyer Street, South Hackensack, NJ 07606.

Sensors:

Sensor Switches: Israel Aircraft Industries Ltd.'s AVP-1 sensor switch, to accommodate 2 taut wire lines. Sensor harness shall facilitate activation of the alarm switch by either one of the two wires connected to each sensor switch.

Sensor Posts: Designed to contain the sensors and permit their positioning at any point along the post. Equip each post with a security feature which serves to generate an alarm any time it is tampered with or an attempt is made to dismantle it.

Sensor Post Rear Cover: Extruded aluminum rigid channel, to house the sensor switches with the anti-clamping method. Also equip with special raceway for sensor wiring.

Sensor Post Front Cover: Extruded aluminum, designed to accommodate overall design of the sensor post.

Sensor Post Paging Systems: The system employs two indicating lamps on each sensor post. A faulty sensor on the post will cause the corresponding indicating lamp on the post to light up and warn the operator/inspector. This warning is displayed at the time when the fault occurs.

Slider Post Accessories: Slider mechanism with accessories which serve to support the wire system, converting vertical force into horizontal movement.

Anchor Post Accessories: Link rods, with breakaway connecting strips, designed to break off whenever a vertical force (such as that applied when climbing) acts upon them.

Information Cable: Electrically conductive wires which transmit the signal delivered by the sensors to the control center.

End-of-Line Element: Supervision device.

* + - 1. MOVEMENT TRANSFER WIRES
         1. High tensile, double-stranded steel wires:

1.7 mm diameter per stand.

Zinc coating.

Weight 5.15 Kg per 100 meter length.

35 Kg + 5 Kg recommended tension.

Barbed (4 point) unless indicated on drawings to be non-barbed wire.

Average spacing of the barbs shall not exceed 125 mm.

* + - 1. STEEL POSTS AND SINGLE OUTRIGGERS
         1. Comply with ASTM A120 for requirements of Schedule 40 piping.
         2. Posts:

Pipe (Schedule 40): 6.625 inch OD, 18.97 lb per lin ft for corner and end posts; 4.0 inch OD, 9.11 lb per lin ft for anchor posts; 2.375 inch OD, 3.65 lb per ft for sensor and slider posts and post braces.

Class B Steel Tubing: 2.375 inch OD 3.11 lb per lin ft for sensor and slider posts and braces. SS-40 fence pipe as manufactured by Allied Tube and Conduit Corporation, Harvey, IL.

* + - * 1. Finishes:

Pipe: Galvanized in accordance with ASTM A120, 2.0 oz zinc per sq ft.

Class B Steel Tubing: Exterior; 1.0 oz zinc per sq ft plus a coating of chromate and polyurethane. Interior; zinc rich organic coating.

* + - 1. CHAIN LINK FABRIC
         1. Comply with standards of the Chain Link Fence Manufacturer's Institute.
         2. Chain link No. 9 gage, 2 inch mesh.
         3. Selvages: Top side twisted and barbed.
         4. Finish: Galvanized, ASTM A392 Class II zinc coated after weaving, with 2.0 oz per sq ft.
      2. RAILS, POST TOPS AND ACCESSORIES
         1. Pipe: 1.660 inch OD, 2.27 lb per lin ft (Schedule 40).
         2. Post Tops: Steel, wrought iron or malleable iron.
      3. CONCRETE
         1. Portland Cement concrete having minimum compressive strength of 2,500 psi at 28 days.
      4. INFORMATION CABLE
         1. Type MCC-T: Multi-conductor cable with 6 individual shielded twisted pairs of insulated 20 AWG stranded copper wires enclosed in a jacket suitable for direct burial in earth: Belden Corp.'s 9886, or Remee Product Corp.’s 3039DB.
      5. TAUT WIRE CONTROL UNIT
         1. Israel Industries Ltd.'s DTM 51 Control Unit having:

Rack mountable feature.

Battery Charger and standby batteries.

Batteries sized to operate control units for a minimum of 4 hours upon loss of AC power.

Sealed lead-acid gelled electrolyte batteries.

Relay module.

* + - 1. ACCESSORIES
         1. System shall include all accessories required to perform the functions summarized in SYSTEM DESCRIPTION and indicated on the drawings.
      2. MARKERS AND NAMEPLATES
         1. Markers: Premarked self-adhesive; W.H. Brady Co.'s B940, Thomas and Betts Co.'s E-Z Code WSL self-laminating, Ideal Industries' Mylar/Cloth wire markers, Markwick Corp.'s permanent wire markers, or Plastic Extruded Parts Inc.’s Flexible Sleeve or ID Band Markers.
         2. Nameplates: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.

Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).

Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.

Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

1. EXECUTION
   * + 1. INSTALLATION
          1. Space posts equidistant, maximum 10 feet on center.
          2. Earth: Excavate trenches and holes as indicated for buried fabric and posts. Set posts in center of hole and fill hole with concrete. Plumb and align posts. Vibrate or tamp concrete for consolidation. Finish concrete in a dome shape above ground to shed water. Do not attach fabric to posts until concrete has cured a minimum of 7 days.
          3. Rock: Drill holes into solid rock 1 inch wider than pipe diameter, 12 inches deep for sensor and slider posts, and 18 inches deep for anchor posts. Set posts into holes and fill annular space with non-shrink grout.
          4. Backfill: Place backfill and fill materials in layers not more than 6 inches in loose depth. Before completion, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or that contain frost or ice.
          5. Compaction: Compact each layer of fill and backfill to 90 percent maximum density. Compact bearing surface material at a moisture content suitable to obtain the required densities, but at not less than 3 percent drier than the optimum content as determined by ASTM D1557.
          6. Install taut wire fence and alarm system in accordance with the Company's printed instructions and interconnect with perimeter security multiplex system (Section 281603) for a complete integrated system.
          7. Make connections and splices at sensor posts, surge protection units, and control unit only.
          8. Use markers to identify conductors at terminal strips (designations shall correspond with point to point wiring diagrams).
          9. Install nameplate indicating zone number on each sensor post.
       2. FIELD QUALITY CONTROL
          1. Preliminary System Test:

Preparation: Have the Company Field Advisor adjust the completed system and then operate it long enough to assure that it is operating properly.

Run a preliminary test for the purpose of:

Determining whether the system is in a suitable condition to conduct an acceptance test.

Training Facility Personnel.

Checking and adjusting equipment.

* + - * 1. System Acceptance Test:

Preparation: Notify the Director's Representative at least 3 working days prior to the tests so that arrangements can be made to have a Facility Representative witness the tests.

Make the following test as an integral test required for Section 13703:

Test each system function step by step as summarized under SYSTEM DESCRIPTION.

Perform simulated escape attempts listed below at 2 locations in each zone unless otherwise directed (Director's Representative shall select exact location and type of escape attempt or combination of attempts). Each penetration of the taut wire system shall produce an alarm. If it does not, wait 30 seconds and repeat in the same location. If misses are repeated in the same location, the entire zone must be corrected and retested. The simulated escape attempts shall be performed by a person weighing 100 lbs or more. Provide safety equipment and take proper precautions when performing tests. Terminate each attempt upon detection.

Fast Climb Over: Approach and make contact with the fence and rapidly scale the fence.

Slow/Stealthy Climb Over: Approach and make contact with the fence and slowly, deliberately, and stealthfully attempt to climb to the top of the fence.

Climb Through: Spread wires apart and climb through.

Cut Through: At a minimum of one location in each zone, cut a strand of wire.

Perform the following tests to show that the system will not alarm from the following stimuli:

A person weighting 100 to 200 lbs. walking at 3 mph within 10 feet of the protected fence.

Omit subparagraph below if horse mounted patrols are not used.

A person on horseback riding at 3 mph within 15 feet of protected fence.

Make all repairs and supply all equipment necessary for system adjustment and testing.

Submit written report of test results signed by Company Field Advisor and the Director's Representative. Mount a copy of the final report in a plexiglass enclosed frame assembly adjacent to the main security console.

* + - * 1. System Testing and Adjusting During Guarantee Period:

After satisfactory completion of acceptance test, Facility personnel will investigate and record all system alarms. If the system does not meet the following criteria it shall be considered defective under the terms of paragraph 9.8 of the General Conditions:

False alarms that are internally generated within the system shall not exceed 1 per 100 hrs.

False alarms caused by the following weather conditions shall not exceed 1 per zone per 48 hours:

Wind up to 30 mph.

Rain up to 3 inches per hour.

Snow up to 5 inches per hour.

Within one week of notification that any zone does not meet the above criteria, make arrangements for the Company Field Advisor to correct the zone and retest in accordance with 3.02 C.2. b. and c.

END OF SECTION 281608