

## **SECTION R13**

### **Furnishing and Planting Trees, Shrubs and Ground Covers**

#### **R13 01 Scope**

Under this Specification, the Contractor shall furnish and plant trees, shrubs, vines, ground covers and other plants, shall prepare and finish planting beds, and shall perform maintenance and other incidental planting procedure work, all as necessary to complete the planting operations in a workmanlike manner according to the provisions of this Specification and to accepted horticultural practice.

Trees, shrubs, vines, ground covers and other plants will herein be referred to collectively as "plants" or "plant material".

#### **R13 02 Kinds, sizes, quantities and locations of plants**

The kinds, sizes and quantities of plants to be furnished and planted and the locations at which they are to be planted shall be as called for on the Drawings and the Special Specification of Particular Application, or as designated by the Engineer.

#### **R13 03 Quality of plant material**

1. **General:** All plant material shall comply with Iraqi Laws with respect to inspection for plant diseases and infestation, and such inspection certificates as are required by Law shall accompany each shipment and be filed with the Engineer's Representative. All plants shall be first-class representatives of their normal species or varieties, and shall have average or normal well-developed branch or cane systems together with vigorous root systems. Plants cut back from larger sizes to meet specified sizes will not be acceptable. Plants shall be free from disfiguring knots, sun scald, abrasions of the bark, wind or freezing injury or other disfigurements. Plants shall show the appearance of normal health and vigor and shall bear evidence of proper top and root pruning. Unless otherwise set forth in the Special Specification of Particular Application or indicated on the Drawings, all plants shall be nursery-grown.

2. **Trees:** Trees shall have straight trunks, well-branched with symmetrical top, and intact leader. They shall have no cuts of limbs over 2cm diameter which have not completely healed over. Each tree shall possess the characteristics for its variety and growth typical of such trees in the region.

3. **Shrubs:** Each shrub shall possess the characteristics of the variety and growth typical of such shrubs in the region.

4. **Vines, Ground Cover and Other Plants:** Vines, ground cover and other plants, such as perennials, which are furnished in pots or other containers and which have been acclimatised to outside conditions will be acceptable provided they are equal to field grown stock.

5. **Collected Plants:** Collected, wood-grown or natural seeding plants, if permitted for use by the Special Specification of Particular Application or by indication on the Drawings, shall conform in quality, size and grade with the respective requirements herein given for nursery-grown stock. In all cases, such collected, wood-grown or natural seedling plants shall be of recognized first quality, clean, sound stock free from decayed

or decaying stumps and free from fire injury.

### **13 04 Handling and shipping**

Immediately prior to shipping, all plants shall be dug, handled, prepared and packed for shipment with reasonable care and skill, in accordance with recognized standard practice for the kind of plant concerned, and in compliance with provisions 1 to 4 which follow:

1. **General:** The root systems of all plants shall not be permitted to dry out at any time and they shall not be exposed to artificial heat or to freezing temperatures. During transportation, all plants shall be packed adequately to insure protection from the sun, wind and climatic or seasonal injuries. Tarpaulins or other covers shall be placed over plants when they are transported by trucks or in open freight cars for considerable distances. All bare-root plants shall have their root systems protected by wet shingle, tow, moss or other suitable material. All earth balls shall be firm and intact and none shall be "made" balls. All balled and Hessian-covered plants shall at all times be handled by the ball, and not by the plant.

2. **Trees:** All evergreen trees shall be balled and Hessian covered, except that small trees will be acceptable in suitable containers. The ball shall be firm and the Hessian shall be sound at the time of delivering and placing the tree on the project.

Deciduous trees supplied in bare-root condition, shall have had their root systems puddled in a clay solution of sufficient density as to adhere to all parts of the root system. Deciduous trees may be supplied earth balled and Hessian covered or in containers if the Contractor so desires.

The head of each tree shall be carefully tied to prevent fracture of branches.

3. **Shrubs:** All evergreen shrubs shall be earth balled and Hessian covered or in suitable containers as above provided for evergreen trees. Deciduous shrubs may be supplied bare root earth balled and Hessian covered or in suitable containers as provided above for deciduous trees.

When collected, wood-grown, natural seedling stock or other non-nursery grown shrubs are permitted or called for or permitted by the Special Specification of Particular Application, or the Drawings, they will be specified as "clumps" of various classifications. Collected plants shall be taken from soil which has produced a fibrous root system typical of the nature of the plant. The clumps shall be dug with earth and incidental vegetation adhering to the roots. If the soil or habit of the root growth is such that the roots are not adequately protected, the root systems shall be wrapped in Hessian or other suitable material.

4. **Vines, Ground Covers, Perennials, etc.:** Vines, ground covers, perennials and other similar plant material supplied in pots, tins, and other suitable containers, will be referred to collectively as pot-grown plants. They shall be supplied as specified in the Special Specification of Particular Application or as indicated on the Drawings. The root systems must be well protected and the plant supplied in accordance with the Specification of quality and protection set forth above. Pot-grown plants shall be well developed and have sufficient roots to hold the earth together intact after removal from the containers and at the same time not be root-bound.

### **R13 05 Labeling of plant material**

Legible labels shall be attached to each plant which is delivered to the site as a separate unit and to each box, bundle, bale or container containing one or more plants. The labels shall give the approved horticultural name, size, age or other detailed data required to identify the plant as conforming to Specification and, when not attached to separate plants, the label shall show the quantities of each specified plant contained in the box, bundle, bale or container.

### **R13 06 Inspection and rejection**

All plants intended for use on the project shall be subject to inspection by the Engineer's Representative at any place and at any time. The Contractor shall inform the Engineer's Representative at the earliest practicable date as to the sources of plant materials to be furnished on the project, and shall give the Engineer's Representative at least 48 hours' notice prior to delivery of plant material at the site of the planting operation

After arrival at the site of the work and prior to the time of planting, each plant will be inspected by the Engineer's Representative for conformance to the Specification, Special Specification of Particular Application and Drawings, and such plants as do not conform thereto will be marked or otherwise identified as "rejected." All rejected plant material shall be removed from the project and shall be replaced by the Contractor with plant material conforming to all specified requirements, all at the Contractor's expense.

### **R13 07 Substitution of plants**

No substitutions of plant material will be permitted unless it is proved to the satisfaction of the Engineer's Representative that specified plants are not available during the normal planting season occurring within the Contract period. If substitution of plant material is thus permitted, it shall be made only with the prior approval of the Engineer's Representative and shall be subject to adjustment, either for or against the Contractor, in such amount as the Engineer may consider to be fair and equitable.

### **R13 08 Temporary storage**

After being dug and prior to planting on the project, all plant material shall be properly protected against injury at all times. Plants which are not planted or which are not to be planted within one day after arrival on the project shall be given special protection as follows:

Bare-root plants shall be "heeled-in" in trenches with the bundles opened, the plants spaced separately, and all roots covered and kept moist.

Earth-balled and Hessian-covered plants shall have their earth balls protected by earth, straw or other suitable material which shall be kept damp or wet to prevent drying out of root systems.

All plants shall be protected from excessive heat or cold and shall be stored in a well-ventilated and shaded place, protected from wind and sun.

### **R13 09 Layout of planting areas**

Plant locations and outlines of planting areas shall be marked out and staked by the Contractor. The planting layouts will be subject to the approval of the Engineer's Representative prior to commencement of the planting operations.

### **R13 10 Preparation of areas for planting**

Areas on which planting is to be done shall be brought to pleasing contour and to the lines and grades directed by the Engineer, after which they shall be cultivated to a depth of 15cm. All weeds and other vegetation growth, large clods, rocks and other debris encountered in the cultivating work, and any excess earth shall be removed and disposed of in a manner approved by the Engineer's Representative.

Excavation or pits for individual plants shall be made in accordance with provisions I to 4 which follow:

1. **General:** Topsoil shall be kept separate from subsoil and shall be rendered loose and friable. Alkaline soil, gravel, stones or other materials or matter encountered in the excavations and which are detrimental to plant growth shall be separated from the soil and disposed of at locations approved by the Engineer's Representative.

2. **Trees:** Pits for trees shall be at least 45cm greater in dimension than (1) the diameter of earth ball, or (2) the spread root system of bare-root trees. Depths of pits for trees shall be not less than 80cm deep and as much deeper as may be necessary to provide a depth of at least 20cm below the bottom of earth ball or root system of the tree when placed at the proper level.

3. **Shrubs:** Pits for shrubs shall be at least 30cm greater in dimension than (1) the diameter of earth ball or (2) the spread root system of bare-root shrubs. Depths of pits for shrubs shall be not less than 30cm and as much deeper as may be necessary to provide a depth of at least 15cm below the bottom of the earth ball or root system of the shrub when -placed at the proper level.

4. **Vines, Ground Covers and Other Plants:** Pits, pockets or trenches for vines, ground covers and similar types of plant materials shall be of such dimensions as will provide space for the spread root systems of the plants. In general, the pits, pockets or trenches shall be wider and deeper than the actual space required, as above provided, by such amount as the Engineer's Representative may determine as being necessary to provide a space of not less than 15cm around and beneath the root systems, in which space good quality topsoil and plant nutrient shall be in place at the time of planting.

### **R13 11 Planting**

All planting work, including backfilling, shall be performed by experienced workmen and in accordance with the recognized best horticultural practice. Plants shall be set plumb and at such a level or elevation that after settlement they will bear the same relation to the level of the surrounding ground as they bore to the ground from which they were dug. All plants shall be planted on and in good quality topsoil to which fertilizers and soil conditioners shall be added and uniformly mixed as called for in the Special Specification of Particular Application. The prepared topsoil used in filling under and around the plant and in backfilling the planting holes, pits or trenches shall be

thoroughly and properly conditioned and settled by careful tamping and watering. For spring planting, a shallow saucer capable of holding water shall be formed about each plant on the surface of the completed backfill.

Earth-balled and Hessian-covered plants shall have all cloth, ropes, etc., removed from the tops of the earth balls, but no cloth shall be pulled out from under the balls. Prepared topsoil shall be carefully tamped around and under the base of each ball to fill all voids.

Bare-root plants shall have their roots spread out in a natural position and the prepared topsoil shall be carefully placed under and among them to fill all voids. Any roots which are broken or frayed shall be cleanly cut off from the plant.

In removing plants from containers, especially those of metal, care shall be taken to prevent disturbance of the root systems or ball of earth therein.

If topsoil of suitable quality is not obtainable for planting area preparation in sufficient quantity for the planting work, the Contractor shall make up any deficiency. Insofar as such is available and can be taken without detriment to the highway development, the Contractor will be permitted to obtain suitable topsoil from areas within the jurisdiction of the Employer, subject to the directions of the Engineer's Representative as to the location, depth, line and grade to which excavations thereof shall be made. The right to take materials from sources not under the jurisdiction of the Employer shall be acquired by the Contractor at his own expense.

Subsoil, and topsoil in excess of the amounts required for filling and backfilling work on the planting areas shall be disposed of by the Contractor in a manner satisfactory to the Engineer's Representative.

### **R13 12 Pruning, guying and staking**

After being planted, all plant materials shall be pruned in conformance to the best horticultural practice appropriate to the type of plant. Pruning shall be such as will remove injured twigs and branches and as will compensate for loss of roots during planting operations. Pruning shall produce clean cuts without bruising or tearing the bark, shall be in living wood and where the wound can heal over properly. Cuts over 2cm in diameter shall be painted with an approved tree-wound paint.

All deciduous trees over 2m in height shall be staked or guyed at the time of planting. The stake shall be placed in the plant excavation and driven securely into the ground prior to planting operations. The tree shall be placed not to exceed 10cm from the stake and fastened tightly to the stake at a point approximately two-thirds the height of the tree by means of 2.5mm wire. At the point of contact with the tree, the wire shall be covered with a length of rubber hose adequate to protect the bark from chafing and injury. The tie wire shall cross between the tree and stake and be securely fixed at the specified height.

Deciduous trees over 2½m high, but less than 4m high, shall be staked in a similar manner. In all cases, the stakes shall be cut off to present a uniformly pleasing appearance as directed by the Engineer's Representative.

Trees of 4m or greater height shall be guyed with 3 guy cables, each consisting of 2 strands of 2.5mm or heavier wire extending from approximately two-thirds the height of the tree to a stake or deadman anchored securely in the ground at a distance from the trunk of about three-quarters the height of fastening. The tree shall be protected by rubber hose or similar means. Evergreen trees or other Hessian covered shrubs over 1½m in height shall also be guyed with 3 cables in a similar manner.

### **R13 13 Cultivation of planting areas**

An area having a diameter of not less than 90cm and lying around each planted tree and shrub and an area having a diameter of not less than 30cm and lying around each planted vine or ground cover shall be loosened and brought to friable condition for a depth of not less than 8cm. Where plant materials are planted in groups in which the plants are so closely spaced as to justify treatment of the area as a unit, the entire area so occupied and extending 60cm beyond the outer ends of the branches or canes shall be cultivated as above provided.

Prior to any planting operations, the planting areas shall be brought to the lines, grades and cross-sections indicated on the Drawings or as directed by the Engineer. If the areas are to have mulching material placed thereon, as indicated on the Drawings or called for by the Special Specification of Particular Application, grades shall be adjusted and established to provide space for the mulch. At edges of walks, pavements and driveways the finished surface shall be approximately 3cm below the surfaces thereof. At edges of lawn areas, the finished surface shall be approximately 5cm above the normal height of grass, the edges of adjoining lawn areas shall be neatly trimmed with a sharp edging tool.

The cultivating work shall include the removal of weeds, the breaking up or removing of clods, the removal of objectionable stones, litter and debris, as well as the removal and disposal of excess soil. Disposal of these materials shall be in a manner satisfactory to the Engineer's Representative.

If mulching is required, as indicated on the Drawings or called for by the Special Specification of Particular Application, the planting areas may be left in a reasonably smooth condition and with irregularities in surface grade and cross-section not exceeding 3cm.

### **R13 14 Mulching**

Planting areas shall be mulched after cultivation with materials of the appropriate kind and placed to the depths indicated on the Drawings or set forth in the Special Specification of Particular Application. Mulch materials shall be spread uniformly over the areas to be mulched and shall be finished to a smooth and uniform surface.

### **R13 15 Fertilizers and soil conditioners**

Fertilizers and soil conditioners shall be mixed with topsoil used in the planting operations and used elsewhere as directed by the Engineer's Representative. Mixing of these materials with soil, mulch and other materials shall be thorough and complete. They shall be incorporated in the work as directed by the Engineer's Representative.

Fertilizer shall consist of an approved compound containing not less than:

- 10 per cent Nitrogen
- 15 per cent Phosphoric Acid
- 10 per cent Potash
- or similar approved composition,

The Contractor may add with the approval of the Engineer's Representative any additional plant nutrients which he considers the constitution of the soil to warrant.

### **R13 16 Maintenance**

Until such time as all work to be done under the Contract is completed by the Contractor and has been finally accepted by the Engineer, the Contractor shall maintain all plant materials and all planting areas efficiently. Maintenance shall consist of keeping plants in a healthy, growing condition by watering, pruning, spraying and other necessary operations. Maintenance shall also include the keeping of planting areas free from weeds, grass, litter and debris, as well as keeping the areas smooth, neat and attractive.

In the event of an infestation from insects or disease, the plants shall be treated by preventative or remedial measures approved for good horticultural practice.

If "healed-in" plant materials have to be held over until a later planting season, such plant materials shall be lifted and replanted in nursery rows. Such emergency storage and maintenance of held-over stock shall be at the sole risk and expense of the Contractor.

### **R13 17 Guarantee and replacement**

Until such time as all work to be done under the Contract is completed by the Contractor and during a maintenance period of one year after acceptance of the planting, the life and satisfactory condition of all plants furnished by the Contractor shall be guaranteed by the Contractor.

During this period, all plants which, in the opinion of the Engineer's Representative are in an unhealthy or badly impaired condition shall be replaced with satisfactory material. After the conclusion of the planting operation and prior to the completion of all normal work to determine the condition of the plantings, all plants then not in a healthy growing condition will be noted for replacement and shall be promptly removed by the Contractor. As soon as seasonal conditions permit, all plants to be replaced shall be replaced by the Contractor with the same kinds and sizes and in the same manner as originally specified and at no extra cost to the Employer.

### **R13 18 Measurement and payment**

Payment for the furnishing and planting of trees, shrubs, vines, ground cover and other plant materials will be made at the price tendered for each for "furnishing and planting" the various types of plants, as set forth in this Specification, in the Special Specification of Particular Application, and on the Drawings.

The price tendered for each for the specified and listed pay items tendered shall be understood to cover and include payment for all labor, materials, planting, maintenance, replacement work, transportation and placing of fertilizers, mulching materials and soil conditioners, and the performance of all other items of work necessary to complete the work in accordance with the Specification, and for which separate payment is not specifically provided.

The quantity to be paid for at the applicable price tendered for a given type of plant material shall be the number of plants of that type furnished in place as specified and finally accepted by the Engineer.

No separate payment will be made for the furnishing of fertilizers, mulching materials and soil conditioners.