

Section 702—Vine, Shrub, and Tree Planting

702.1 General Description

This work includes furnishing and planting vines, shrubs, trees and plants, as well as treating regenerated areas according to the Specifications, Plans, and the Engineer.

702.1.01 Definitions

General Provisions 101 through 150.

702.1.02 Related References

A. Standard Specifications

[Section 108—Prosecution and Progress](#)

[Section 700—Grassing](#)

[Section 882—Lime](#)

[Section 891—Fertilizers](#)

[Section 893—Miscellaneous Planting Materials](#)

B. Referenced Documents

Standardized Plant Names

702.1.03 Submittals

A. Certificates of Inspection

Submit certificates of inspection with the invoice for each shipment of plants as required by law for transportation.

File certificates with the Engineer before the material is accepted. Plants may be rejected at the site regardless of Federal or State government inspections at the place of growth.

B. Substitutions

When both primary and alternate plants are specified, use the alternate only after providing written proof that the primary plants specified are not available. In this case a Supplemental Agreement is not required to use the alternate plants.

When a primary or an alternate plant cannot be furnished, provide the Engineer written proof that neither is available. A Supplemental Agreement is required for substitute plants in this case.

702.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Water	700.2.B
Agricultural Lime	882.2.01
Fertilizers	891.2.01
Plant Topsoil	893.2.01
Mulch	893.2.02
Vines, Shrubs, Trees, and Miscellaneous Plants	893.2.03
Tree Paint	893.2.06
Prepared Plant Topsoil	893.2.07
Stakes	893.2.08
Organic Soil Additives	893.2.09

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A. Plant Specifications

Furnish plants according to the plant name and Specifications included on the Plans titled, “Plant Specifications.”

1. Plant Names

Ensure that the botanical and common names of plants specified conform with the most current edition of Standardized Plant Names, as adopted by the American Joint Committee on Horticultural Nomenclature.

2. Grades

Ensure that plants meet the grade requirements of the most current American Standard for Nursery Stock of the American Association of Nurserymen and any other requirements.

Caliper used for establishing plant grades or trunk sizes is measured according to the American Standard for Nursery Stock. Plant trees with straight stems and symmetrical branches according to their natural growth. Trees with broken or damaged terminal or main stems will be rejected.

3. Substitutions

Use approved substitute plants, as designated by the Engineer, equal in value to specified plants. Request substitutions at least 30 days before the end of the planting season in the area.

B. Nursery Plants

Unless otherwise specified, use plants stock-grown in a licensed nursery under intensive care and cultivation for at least one year. The branch system shall be normally developed and free of disease, injurious insects, disfiguring knots, sun-scald, injuries, bark abrasions, dead or dry wood, broken terminal growth, or other disfigurements. Ensure that proper certificates of inspection accompany nursery grown plants. See [Subsection 893.2.03](#).

C. Collected Plants

Collected plants grow in the wild and are uncultivated and untransplanted. Do not take collected plants from areas infested with insects under quarantine. See [Subsection 893.2.03](#).

D. Approval and Selection of Materials and Work

Select materials and execute operations required under the Specifications and drawings with the approval of the Engineer. Remove rejected materials from the site promptly.

702.2.01 Delivery, Storage, and Handling

A. Bare-Rooted Plants

Tie bare-rooted plants in bundles and place moist sphagnum moss, shingletoe, or other moisture-retaining material around the roots to keep the plants moist for up to 10 days. Over-wrap the bundle with a heavy weight, waterproof, flexible material, covering the roots and one-half of the tops. Keep the plants wrapped until they are planted or heeled-in.

Wrapped plants may be held in the package for up to 10 days from shipment if protected from the sun and wind. If unable to plant plants within 10 days from shipment, unwrap, spread the roots, heel-in using moist soil, and water well.

Protect roots of plants that have been heeled-in from drying out. Cover soil and roots with wet canvas, burlap, or straw while transporting and distributing them for planting. The type of protection depends on weather conditions and the length of time the plants remain unplanted. Use protection methods satisfactory to the Engineer.

B. Balled and Burlapped Plants (B&B)

Ensure that the soil in the ball is the original and undisturbed soil in which the plant has grown.

1. Dig, burlap, transport, and handle the plant carefully to avoid loosening the soil (stripping or exposing the roots).
2. Replace plants rejected because of broken or loose balls, or balls of less diameter than that specified.
3. Adequately protect the roots of balled and burlapped plants, unless they are planted immediately after they are delivered. Completely cover them with damp soil, sawdust, or other moist material until removing them for planting.
4. Keep plants moist while awaiting planting.
 - a. Do not saturate the ball, causing it to pull off in handling.
 - b. Handle B&B plants by the ball and not by the top growth.
 - c. Never leave the balls of plants unprotected overnight.

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C. Container-Grown Plants

Keep container-grown plants moist until planted. Handle them by the container or soil ball and not by the top growth.

D. Collected Plants

Do not collect plants more than 24 hours before planting.

1. Select plants with good shape and form. Do not select poorly shaped, weak plants taken from dense shade and crowded conditions.
2. Dig collected plants with a wide root system equal to at least the spread of the top of the plant.
3. Protect the roots with a moist packing material.
4. Load them onto a covered truck, protected from the sun and wind and transfer them directly to the final planting site.
5. Prune collected plants by removing from one-third to one-half of the side branches as directed by the Engineer.

E. Heeled-in Plants

Properly maintain heeled-in plants until they are planted. Do not allow plants to remain heeled-in over the summer or for over 30 days without the Engineer's consent.

F. Injury Prevention

In digging, loading, unloading, planting, or otherwise handling plants, avoid injuring the trunk, branches, and roots of the plants. Injured plants will be rejected. Protect tops of shrubs and trees while in transit to prevent windburn.

702.3 Construction Requirements

702.3.01 Personnel

General Provisions 101 through 150.

702.3.02 Equipment

General Provisions 101 through 150.

702.3.03 Preparation

A. Inspect Plants Before Digging

The Engineer will inspect trees or plants from the bidder's source for acceptability. When rejecting the trees or plants, the Engineer reserves the right to pursue and examine other sources of plants to find acceptable specimens. This change will not constitute an increase in cost to the State.

B. Clear and Grub

Clear and grub before planting or beginning to prepare the plant bed.

C. Prepare Plant Bed

Prepare for planting as follows:

1. Planting Limits

Stake planting limits according to Plan details and the Engineer. Have the Engineer approve the method of plant identification before planting.
2. Applications of Soil Additives
 - a. Apply fertilizer approximately 3 lbs/100 ft² (1.5 kg/10 m²) of bed surface. Fertilizer for plant bed may be 6-12-12 if 4-12-12 is not available.
 - b. Apply agricultural lime for plant bed approximately 5 lbs/100 ft² (2.5 kg/10 m²) of bed surface.
 - c. Spread an organic soil additive, either peat moss or pine bark, evenly throughout the designated area to at least 2 in (50 mm) deep. Thoroughly dig it into the soil to at least 6 in (150 mm) deep using a rotary hoe type tiller or other equipment that evenly mixes the soil, lime, fertilizer, and organic soil additive.
 - d. Till the area until the surface is smooth and free of weeds, roots, rocks, and other debris, to the satisfaction of the Engineer.

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702.3.04 Fabrication

General Provisions 101 through 150.

702.3.05 Construction

A. Seasonal Limitations for Planting

For geographic seasonal limitations, refer to the Planting Zones Map, below. Plant in Zones 1 and 2 between October 15 and March 15. Plant in Zones 3 and 4 between November 1 and March 1.

Planting Zone Map



B. Planting Operations

Plant using either the pit method or the dibble method as called for on the Plant Specification sheet. Before beginning planting of each area, have available the necessary materials including prepared plant topsoil (see [Subsection 893.2.07](#)), water, stakes, and mulch.

When seasonal limitations and weather conditions permit, continuously water, mulch, wrap, guy, and stake, until completing the last operation.

After completing planting, provide a method for retaining water adjacent to the plant according to the details shown on the Plans or as directed by the Engineer.

1. Planting By the Pit Method

a. Placing Bare-Rooted Plants

Plant bare-rooted plants delivered to the pit area. Protect roots from drying out until placing them in the pit.

- Center plants in pits and spread roots as they originally grew.
- Cover and prepare the topsoil according to details shown on the Plans.

b. Placing Balled and Burlapped Plants

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Immediately plant these plants after they are delivered to the pit site. Never allow the balls to remain unprotected overnight.

- Center the ball in the prepared pit, leaving the top of the ball 1 in (25 mm) above the top of the ground for settlement.
- Partially fill the pit with prepared plant topsoil and compact the soil enough to hold the ball firmly.
- Leave the burlap covering in place. Remove wire or twine from the top of the ball.

c. Placing Container-Grown Plants

When the container is delivered to the pit site, split the container from top to bottom and carefully remove the plant.

- Spread into the hole any major roots growing around the container or prune them to remove any circular growth.
- Place the ball in the center of the prepared pit, leaving the top of the ball 1 in (25 mm) above the top of the ground for settlement.
- Partially fill the pit with prepared plant topsoil and compact the soil enough to hold the ball firmly.

d. Completing Pit Plantings

After placing pit plantings, water plants thoroughly the same day regardless of weather or soil moisture conditions.

- After the water has soaked in, add prepared plant topsoil and compact firmly.
- Stop compacting when the compacted prepared plant topsoil is 2 in (50 mm) below the adjacent ground.
- Fill each pit with loose, prepared plant topsoil according to the details shown on the Plans.
- After planting, provide retained water adjacent to the plant according to the Plans or as directed by the Engineer.

2. Planting By the Dibble Method

If the Plans require the dibble method, perform the work as outlined. Standard dibble blades are made in 10 in (250 mm) and 12 in (300 mm) heights. Use the 12 in (300 mm) blade on all plants except those with a root system of 8 in (200 mm) or less.

Locate plants as shown on the Plans or as approved by the Engineer. Only plant when there is adequate moisture in the ground and when the ground is not frozen.

Follow these steps when grass or other vegetation is present:

- a. Mow an area at least 2 ft (600 mm) on all sides of the proposed location of the individual dibbled plants to a height of 1 in (25 mm).
- b. Apply mulch of the specified type and amount to the mowed area before planting.
- c. Dibble the seedling into the soil.
- d. Dibble the plant within 48 hours after mowing.
- e. Complete each planting according to the Plan details to retain water adjacent to the plant.

C. Mulching

1. For Pit Plantings

Follow these requirements when mulching for pit plantings:

- a. Where the distance between plants is 4 ft (1.2 m) or less, spread mulch throughout and 2 ft (600 mm) beyond the outermost plants. Where plants are more than 4 ft (1.2 m) apart, apply mulch in a circular fashion around each plant, forming a ring 4 ft (1.2 m) in the outside diameter.

If plant pits are greater than 4 ft (1.2 m) in diameter, ensure that the mulch extends out to cover the berm as shown in the planting details on the Plans.

- b. Apply mulch within 5 days of planting at least 4 in (100 mm) loose for pine straw or 3 in (75 mm) loose for pine bark to obtain a compacted depth of at least 2 in (50 mm).

Compaction occurs naturally. Check compaction at least three months after spreading and exposing the mulch to the elements.

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If the compacted depth is less than 2 in (50 mm), apply additional mulch to deficient areas 1 month following notification.

2. For Plantings by the Dibble Method

Apply mulch according to [Subsection 702.3.05.C.1](#) with the following exceptions:

- a. Apply mulch before planting.
- b. Ensure that the minimum compacted height after 3 months exposure is 1 in (25 mm) instead of 2 in (50 mm).

D. Wrapping

Unless otherwise specified, tightly wrap the trunks of deciduous trees over 1.25 in (32 mm) in caliper. Wrap in strip burlap or waterproof crepe tree wrapping paper or other approved materials.

1. Begin wrapping at the ground and extend spirally up and beyond the first rosette of branches with an overlap of one half the width of the wrapping material.
2. Tie the wrapping material securely with binder twine spaced every 12 in (300 mm) for the full length of the wrapping. Wrap immediately after planting.

E. Staking and Guying

1. Perimeter Staking

Place perimeter stakes 2 in x 2 in x 36 in (50 mm x 50 mm x 900 mm). Stake the perimeter of indicated regenerated areas within specified planting dates according to the Plans or as directed by the Engineer.

2. Vine, Shrub, and Miscellaneous Plant Staking

Use stakes to identify isolated vines, shrubs, and miscellaneous plants outside of solid mulched beds according to Plan details.

3. Tree Staking and Guying

Stake trees with an identification stake and guy according to the details and dimensions shown on the Plans. Each guy wire shall consist of 18-gauge (1.2 mm) malleable galvanized iron wires twisted into a single strand and enclosed loosely into a rubber hose (or other approved covering or guying materials) extending around the trunk.

- a. After fastening the wire to the stake by tying or twisting it into a figure-8, nail or staple the wire to the stake to prevent slippage using a 4d nail or a 0.5 in (13 mm) staple.
- b. Tighten the wire so that twisting the wire causes a slight strain between the tree and the stake.
- c. Place guy wires above the first rosette of lower branches and fasten wire to the stake approximately 6 in (150 mm) above the ground. Plastic tape of the accepted size and quality may be substituted for the hose and wire specified above. Replace at no additional expense to the Department, any plastic tape that breaks or loosens.

F. Pruning

1. Prune plants on the site before planting and after initial inspection by the Engineer. Never prune severely to get plants to meet Specifications.

- a. Follow modern horticultural practices and use approved tools designed for pruning. Lopping, topping, or shearing trees or shrubs will result in rejection.
- b. Prune back damaged, scarred, frayed, split, and skinned branches, limbs, and roots to live wood nearest to the next sound, outside lateral bud, branch, limb, or root.
- c. Leave the terminal leaders or buds in trees intact.
- d. Remove approximately one-third of the smaller branches on nursery grown vines, shrubs, and trees for root-top balance.
- e. Prune roots, when necessary, as directed by the Engineer. Treat cuts 1 in (25 mm) in diameter or larger with an approved tree paint or wound dressing. See [Section 893](#).

G. Watering

Apply water in a manner to prevent erosion. Water plants at the time of planting. Water after applying fertilizer called for in [Subsection 702.3.05.H](#) and as necessary to maintain enough moisture to promote plant growth.

Apply enough water to wet the soil to a depth slightly below the roots. Direct the water to the ground around the plant, not the tops.

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H. Spring Application of Fertilizer

1. Method and Rate of Application

Follow these requirements when applying fertilizer in the spring:

a. Trees

Deep-root feed trees each spring by using a 8-12-12 slow release fertilizer. Bore a 1.5 in (38 mm) diameter hole between 18 in to 24 in (450 mm to 600 mm) deep at the rate of 8 to 10 holes per tree.

Use 1 cup (0.25 L) of fertilizer per 1 in (25 mm) in caliper of tree measured 6 in (150 mm) off the ground. Fill the holes with soil upon completing each hole.

b. Shrubs

Fertilize shrubs with a 6-12-12 slow release 60 percent organic fertilizer by spreading fertilizer around the base of the plant and working it into the soil by hand. Use 0.5 cup (0.12 L) of fertilizer per foot (0.3 m) of shrub height.

c. Bed Areas

Spread fertilizer on bed areas (defined by method of planting in [Subsection 702.3.05.B](#)), over the mulch at the rate of 3 lbs/100 ft² (1.5 kg/10 m²) using 6-12-12 or 8-12-12. Thoroughly water in the plants.

d. Vines

Fertilize vines when not planted in a bed at the rate of 1/4 cup (60 ml) per vine using 6-12-12 or 8-12-12. Thoroughly water in the plants.

e. Regenerated Areas

Spread fertilizer on regenerated areas evenly at a rate of 3 lbs/100 ft² (1.5 kg/10 m²) and thoroughly water in using 6-12-12.

NOTE: 2 cups (1 L) of 6-12-12 or 8-12-12 equals 1 lb (1 kg).

2. Time of Application

Apply fertilizer in the spring in Zones 1 and 2 (with reference to the Planting Zones specified in [Subsection 702.3.05.A](#)) between April 1 and April 15. Apply between March 15 and April 1 for Zones 3 and 4.

For late plantings, do not apply fertilizer less than 30 days after the plantings.

3. Additional Fertilizer Grades 8-12-12 or 6-12-12

Approximately one month after the spring fertilizer is applied, the Engineer will inspect planted areas and determine if an additional application of fertilizer is needed for any plant or group of plants.

If the Engineer determines additional fertilizer is required, apply fertilizer at the rate specified in [Subsection 702.3.05.H](#). Make the additional application between June 15 and July 15th.

I. Treatment of Regenerated Areas

Treating regenerated areas includes staking the perimeter and applying fertilizer in the spring.

Pruning, mulching, staking (except perimeter staking), guying, wrapping, mowing, weeding, and watering (except watering following fertilization) are not required.

Perform perimeter staking as specified in [Subsection 702.3.03.C.1](#). Apply fertilizer in the spring as specified in [Subsection 702.3.03.C.2](#).

J. Restoration and Cleanup

Restore areas where existing grass has been damaged or scarred during planting operations at no expense to the Department. Restore the disturbed areas to their original conditions as directed by the Engineer. Clean up debris, spoil piles, and containers and leave the Project area clean.

702.3.06 Quality Acceptance

Preserve the plants in a healthy growing condition. The acceptability of the plant material furnished and planted as specified will be determined at the end of an establishment period.

The plant establishment period is the period from the last planting specified in [Subsection 702.3.05.B](#) until the following October 1. Plant in one planting season.

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A. First Establishment Period

At the end of the first planting season, the first establishment period begins. The Department will make the first semi-final inspection 30 days before the end of the first establishment period. Replace dead, dying, diseased, unsatisfactory, and missing plants during the next planting season.

B. Second Establishment Period

At the end of the second planting season, the second plant establishment period begins. The Department will make the second semi-final inspection 30 days before the end of the second establishment period. Again, replace dead, dying, diseased, unsatisfactory, and missing plants.

C. Final Inspection

The Department will make the final inspection of the plants during May, following any needed replacements during the previous planting season. Assume responsibility for the plants until the Final Acceptance of the Project or a portion of the Project.

702.3.07 Contractor Warranty and Maintenance

Project maintenance includes, but is not limited to, watering, cultivating, weeding, pruning, repairing, adjusting guys and stakes, and performing other work as ordered by the Engineer until final acceptance.

Promptly remove from the Project area dead plants or those that no longer conform to the requirements of [Subsection 702.2.A.2](#).

Mow the entire right-of-way within the limits of the Project up to a maximum of three times per calendar year.

A. Leaning Trees

Straighten leaning trees by pulling them over and tying them with new guy wire or stake. Wrap wire around the tree with a piece of rubber hose to avoid cutting the tree.

B. Shrub Maintenance

1. Pruning

Prune or thin shrubs, as directed by the Engineer, at least two times per year, once before spring and once during mid-summer. Maintain an attractive shape and fullness with respect to the intended character of the planting. See [Subsection 702.3.05.F](#).

2. Mulching

Continuously maintain shrub and tree beds with a clean, freshly mulched appearance using the mulch originally specified. See [Subsection 702.3.05.C](#).

3. Applying Fertilizer

See [Subsection 702.3.05.H](#).

4. Applying Insecticides

Inspect shrubs and trees for insects, grubs, mites, etc., once every two weeks. Apply insecticides and pesticides according to the manufacturer's or installer's recommendations to effectively control insect infestation. Insecticides such as volck oil, lindane, captan, and sevin are commonly used to control insects and pests.

5. Edging

Edge and trim shrubs, ground cover areas, and tree beds to maintain a clean and manicured appearance.

6. Watering

During summer months, if it does not rain enough to keep shrubs moist, water shrubs thoroughly by soaking each plant.

a. Thoroughly water smaller plants with shallow root systems, such as the Evergreen Holly once a week during unseasonably dry conditions.

b. Water plants thoroughly by soaking each plant. Water each shrub for approximately one-half minute. Junipers will survive on lesser amounts of moisture. They do not need water as regularly as Evergreen Hollies.

7. Policing

Remove debris such as paper, broken limbs, bottles, cans, etc., while maintaining the site.

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C. Tree Maintenance

1. Watering

Soak the trees during a drought (no rain for three weeks during summer months).

- a. Check trees and plants weekly for dryness by removing the mulch from their base and sampling the soil approximately 6 in (150 mm) deep.
- b. If no moisture is there, water the dry tree thoroughly until the ground is saturated to the base of the tree rootball, normally 24 in to 30 in (600 mm to 750 mm) deep.

2. Mulch

Maintain a good heavy mulch around trees and shrubs to preserve moisture as specified in [Subsection 702.3.05.C](#).

3. Fertilizer

See [Subsection 702.3.05.H](#).

4. Abnormal Conditions

Periodically (once every two weeks) observe trees and shrubs for abnormal conditions such as insects, borers, web worms, red spiders, etc., and immediately treat.

5. Sucker Growth

Remove sucker growth three times a year. Sucker growth is the shoots that sprout out around the base of the tree trunk.

6. Deadwood

Remove deadwood at least two times a year. Prune dead branches, paint cuts and wounds or scars with asphaltic tree paint. See [Subsection 702.3.05.F](#).

7. Insect Control

Apply insecticides as necessary to control bores, aphids, mealy bugs, mites, and tent worms. Follow the manufacturer's instructions. Lindane and sevin are commonly used for this treatment.

NOTE: Use chemicals according to Federal, State and county directives on environmental control that carry an EPA approval number.

702.4 Measurement

A. Plants

Plants of the name and size specified are measured for payment according to the number planted that are still living and in an acceptable condition at the time of Final Acceptance.

B. Fertilizer

Spring application fertilizer applied to planted and regenerated areas will be the actual number of pounds (kilograms) placed and accepted. Fertilizer, lime, and plant topsoil used in prepared plant topsoil or plant bed preparation are not measured for separate payment.

C. Perimeter Stakes

Perimeter stakes measured for payment are the number in place and accepted.

D. Clearing and Grubbing

Clearing and grubbing is not measured for payment unless the Item is shown as a separate Pay Item in the Proposal.

702.4.01 Limits

General Provisions 101 through 150.

702.5 Payment

A. Plants

Plants measured for payment will be paid for as follows:

1. After planting satisfactorily, the Department will pay 70 percent of the Contract Unit Price bid per each on the next estimate.

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2. Until Final Acceptance, perform all required maintenance according to [Subsection 702.3.07.C](#) when necessary or as ordered by the Engineer.

If the Contractor fails to properly maintain the landscaping, the Department will assess liquidated damages according to the schedule of deductions shown in [Subsection 108.08](#), but not less than \$150 per calendar day, and will continue until project maintenance is approved by the Engineer.

The liquidated damages are in addition to those specified for delay or failure in completing The Work within the specified time.

3. After the first semi-final inspection, the Department will pay 10 percent of the Contract Unit Price bid per each of the live, viable plants.
4. After the second semi-final inspection, the Department will pay 10 percent of the Contract Unit Price bid per each of the live, viable plants.
5. At Final Acceptance, the Department will pay the remaining 10 percent less the Full Contract Unit Price bid per each plant not accepted.

Payments are full compensation for furnishing, planting, replanting as required, pruning, staking (except for perimeter staking, wrapping and guying, soil conditioning, and preparing plant beds) including applying additives, digging plant pits, preparing plant topsoil and mulch, disposing of waste material, and maintaining the plants during the plant-establishment period.

B. Fertilizer

All grades of fertilizer applied in the spring, measured as specified above, are paid for at the Contract Price per pound (kilogram) or per ton (megagram), whichever is indicated in the Proposal. Payment is full compensation for furnishing and applying and for watering regenerated areas.

C. Perimeter Stakes

Perimeter stakes measured for payment will be paid for at the Contract Price per each. Payment is full compensation for furnishing and placing the stakes.

Payment will be made under:

Item No. 702	Plant name and size	Per each
Item No. 702	Fertilizer, spring application	Per ton (megagram)
Item No. 702	Perimeter stakes	Per each
Item No. 702	Spring application fertilizer	Per pound (kilogram)

702.5.01 Adjustments

General Provisions 101 through 150.