

**DIVISION 32 - EXTERIOR IMPROVEMENTS**

**32 05 00 COMMON WORK RESULTS FOR EXTERIOR IMPROVEMENTS**

- 1 Contractor shall be responsible for all layout and grade staking.
- 2 Provide dumpster enclosure in accordance with Standard Detail 32.013 in Appendix C.

**32 10 00 BASES, BALLASTS AND PAVING**

**32 11 00 BASE COURSES**

**32 11 13 SUBGRADE MODIFICATIONS**

- 1 Drives and Parking: As a minimum, all drives, parking, and walks, which can be used by trucks, must be constructed with the clay sub-base sloped to a perforated doubled wall ADS N-12, or equal, under drain system. In parking areas the drains are to be 30 to 35 ft. on center maximum, or installed per the design drawings. On drives, the drain is to be on one side, at a minimum.

**32 11 16 SUBBASE COURSES**

- 1 Sub-base material: Minimum of 12 inches, or per design drawings whichever is greater, MDOT 902.08 Granular Material Class II.

**32 11 23 AGGREGATE BASE COURSES**

- 1 Aggregate base course for standard paving: Minimum eight inches (8") MDOT 902 open-graded aggregate base MDOT 4G (formerly 21AA.) Shall comply with production gradation limits shown in Table 1 below:

**TABLE 1 - STANDARD PAVING**

Sieve	Gradation Limits, Percent passing
1½ inch	<100
¾ inch	60 - 80
½ inch	35 - 65
#8	10 - 24
Loss by wash	6.0 max.

Crushed material: 95% minimum

Loss: Los Angeles Abrasion (MTM 102): 50% maximum

- 2 Aggregate base course for porous paving: Shall comply with the sieve and gradation limits shown in Table 2 below:

**TABLE 2 - POROUS PAVING**

	1½"	1"	¾"	½"	3/8"	#8	#30	LBW
Base Course	100%	90 - 100%	20 - 80%	0 - 5%	0 - 5%	0 - 5%	0 - 5%	0 - 2%

Crushed material: 70% minimum

Loss: Los Angeles Abrasion (MTM 102): 35% maximum

- 3 Filter fabric in porous pavement: Woven geotextile fabric

## **32 12 00 FLEXIBLE PAVING**

### **32 12 01 QUALITY CONTROL AND ASSURANCE**

- 1 The following sampling and testing procedures are to be followed in completing the work. All equipment requirements to perform these sampling and testing procedures shall apply.
  - A ASTM D 1559-89 Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (Section 4.5).
  - B ASTM D 2172 Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures.
  - C ASTM D 2041 Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
  - D ASTM D 2726 Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens.
  - E ASTM C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - F ASTM C 117 Test Method for Materials Finer Than 75- $\mu\text{m}$  (no. 200) Sieve in Mineral Aggregates by Washing.
  - G ASTM E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications.
  - H MTM (Michigan Test Method) 311 Determining Aggregate Gradation for Bituminous Mixture.
  - I MTM 117 Determining Percentage of Crushed Particles in Aggregates.
  - J MTM 118 Measuring Fine Aggregate Angularity.
  - K MTM 110 Determining Deleterious and Objectionable Particles in Aggregates.
  - L MTM 319 Determination of Asphalt Content from Asphalt Paving Mixtures by the Ignition Method.
  - M MTM 313 Sampling Bituminous Mixtures.

#### **32 12 01.13 QUALITY CONTROL (CONTRACTOR)**

- 1 Bituminous Mixture: The contractor will take random samples of loose mixture at least every 400 tons of mixture, or a sampling frequency agreed upon with the engineer. The engineer will be provided a split sample of all QC samples taken by the contractor. This sample may be taken anywhere in the production process, except behind the paver. The contractor will be responsible for establishing process quality control targets for air voids, asphalt binder content, aggregate gradation, Gmm, obtaining QC samples, and conducting QC testing in accordance with the contractor's quality control plan (QCP).
- 2 Each QC sample shall be identified to allow all test reports to be linked to a specific lot or subplot within the project.
- 3 The contractor shall maintain daily control charts and have available for review at the plant at all times. Copies of control charts shall be provided to engineer if requested. All test results shall be plotted and used in quality control decisions. When corrective action is necessary, the contractor shall notify the engineer in writing of the specific action taken, if it requires a JMF adjustment.
- 4 In-place Density: The contractor shall have a density gage available for quality control testing during compaction process. The contractor shall have the capability to take 6" cores from random locations throughout the paved area for acceptance testing. The contractor may take up to three informational cores from each mixture type, to help correlate the density gage. Minimum in-place density shall average 95 percent of theoretical maximum density, Gmm.

#### **32 12 01.16 QUALITY ASSURANCE (ENGINEER)**

- 1 Bituminous Mixture: The engineer may collect bituminous mixture (loose) quality assurance samples and provide the contractor with splits of these samples. If the criteria for the verification

procedure are satisfied, the contractor's test results may be incorporated into the acceptance and payment decisions for the mixture. During the course of production, the engineer may acquire random samples at any point in the production process. These samples may be tested to determine if the mixture, the aggregate and the binder meet all of the specification requirements contained in the contract document. As the samples are collected, the engineer may assign an alphanumeric identifier to the sample and split, which can be used to trace the test results to the lot and subplot. This alphanumeric identifier may be included on all engineer test reports associated with that sample. An example is 4-2-A, which might designate the engineer's split (A) of the sample from subplot 2 of lot 4 on a project.

- 2 A minimum 16,000-gram sample may be taken. The sample will be divided equally for contractor and engineer testing. The following tests may be conducted by the engineer on the QA sample splits.
  - A Maximum Specific Gravity, *G<sub>mm</sub>* (ASTM D 2041)
  - B Bulk Compacted Density (ASTM D 1559, paragraph 4.5)
  - C Air Voids (calculated)
  - D Voids in Mineral Aggregate, *VMA* (calculated)
  - E Composition of the Mixture - Asphalt binder content based on calculated value using subplot maximum specific gravity (*G<sub>mm</sub>*) and current JMF effective specific gravity (*G<sub>se</sub>*). The retained *G<sub>mm</sub>* sample may be used for gradation (ASTM C 136, C 117) and crushed particle content (MTM 117) from extracted (ASTM D 2172) or incinerated (MTM 319) aggregate, or from MTM 311.
- 3 In-Place Density: The engineer may identify random core sample locations for each subplot based on longitudinal and transverse measurements. The engineer will mark each core location with a paint dot, which represents the center of the core. The contractor shall drill a 6" core sample at each core location. The contractor shall notify the engineer sufficiently in advance of coring to ensure that a representative can be present to witness the coring and take possession of the core. The core density shall be calculated using the TMD from the test data obtained from that day's sample. The core samples shall be taken after final rolling.
- 4 As an option, when mutually agreed to by the engineer and contractor, the core samples may be waived and the density gage will be used for acceptance testing.
- 5 Core samples shall not be damaged during removal from the pavement. If, for any reason, a core is damaged or determined not to be representative at the time of coring, the engineer will evaluate and document the problem and determine if re-coring is necessary.
- 6 All previous pavement, base aggregate or bond coat material shall be sawed off the bottom of the core samples.
- 7 The core holes shall be filled with hot mixture and thoroughly compacted as part of the coring operation. The method of filling holes and obtaining compaction shall be agreed upon prior to production. Pavement density acceptance testing will be completed within one (1) workday after the cores were taken. Testing will be in accordance with ASTM D 2726. The test results on the compacted bituminous mixture will be used as a basis of acceptance and payment.

### 32 12 01.23 VERIFICATION OF QUALITY CONTROL TEST

- 1 General Procedure: The engineer will review the contractor's sampling and testing procedures, their test results and any engineer quality assurance test results. If, in the opinion of the engineer, sampling and testing procedures are proper, the contractor's quality control test data may be used for acceptance decisions.
- 2 The contractor's QC test results may be considered verified if the following criteria are satisfied:
  - A The difference between the contractor's QC test results and the JMF fall within the single test tolerance shown in Table 3, or
  - B The difference between the engineer's test results and the contractor's test results fall

within the single test tolerance shown in Table 3.

- 3 If the difference between the contractor's QC test results, compared to the JMF, exceed the single test tolerances shown in Table 3, the engineer's test results will be used as the acceptance test. If the subplot is not verified, the contractor shall be notified and given a copy of the test results. Both the contractor and the engineer will verify that testing equipment is calibrated and operating properly, and correct testing procedures have been followed. Unless it is documented that the difference resulted from equipment or procedural problems, the engineer's test results will remain as the acceptance test of record.
- 4 The owner shall pay the cost of one verification test per mixture type. Any additional mixture verification testing for acceptance shall be paid for by the contractor

<b>TABLE 3: Bituminous Quality Assurance Testing Tolerances (+ or -) from JMF</b>		
Parameter	Single Test	Lot Average
Air Voids	1.00%	0.60%
Voids in Mineral Aggregate (VMA)*	1.20%	0.75%**
Maximum Specific Gravity (Gmm)*	0.019	0.012
Asphalt Binder Content*	0.50%	0.35%
*Parameters with Target Values		
**Or less, determined by VMA Value from the 2003 Standard Specifications for Construction. The engineer retains the authority to make necessary adjustments to the JMF to ensure compliance with the intent of the specifications.		

**32 12 16 ASPHALT PAVING**

**32 12 16.13 PLANT MIX ASPHALT PAVING**

- 1 Roadway Bituminous materials: Shall comply with the following and Table 4:
  - A Asphalt Cement; Performance grade 64-28
  - B Bond Coat: SS-1H; 0.05 to 0.10 gallons per square yard
  - C Leveling Course: Bituminous mixture No. 3C modified in accordance with MDOT 501. Weight at 220 (approx. 2" thick) pounds per square yard. Reclaimed asphalt at 15% maximum. Air voids at 3.0% maximum.
  - D Top Course: Bituminous mixture No. 4C modified in accordance with MDOT 501. Weight at 165 (approx. 1.5" thick) pounds per square yard. Reclaimed asphalt at 15% maximum. Air voids at 3.0% maximum

**TABLE 4**

MIXTURE NUMBER	4C MOD.	3C MOD.
VMA% (eff. Spec. gravity)	16.0	15.0
Air Voids %*	3.0*	3.0*
Fines to binder ratio (max.)	1.2	1.2
Fine angularity min. MTM117	4.0	4.0
L.A. Abrasion % Max.	40	40
Soft Particle % Max.	6*	8
<b>GRADATIONS - Percent passing indicated sieve</b>		
1"	100	100
¾"	100	99-100
½"	99-100	90 max.
3/8"	90 max.	77 max.
#4	67 max.	57 max.
#8	15-52	15-45

#16	37 max.	33 max.
#30	27 max.	25 max.
#50	20 max.	19 max.
#100	15 max.	15 max.
#200	3-6	3-6
Crush (min) MTM 18	90	90
* Modified from MDOT Specs.		

- 2 Parking Lot Bituminous materials: Shall comply with the following and table 5:
- A Asphalt Cement; Performance grade 58-28
  - B Bond Coat: SS-1H; 0.05 to 0.10 gallons per square yard
  - C Leveling Course: Bituminous mixture No. 13A modified in accordance with MDOT 501. Weight at 220 pounds per square yard. Reclaimed asphalt at 15% maximum. Air voids at 2.5% maximum. Air voids at 2.5% maximum. No more than 50% of the material passing the No. 4 sieve shall pass the No. 30 sieve
    - (i) Top Course: Bituminous mixture No. 36A modified in accordance with MDOT 501. Weight at 165 pounds per square yard. Reclaimed asphalt at 15% maximum. Air voids at 2.5% maximum. No more than 50% of the material passing the No. 4 sieve shall pass the No. 30 sieve.

**32 12 36 SEAL COATS**

- 1 Seal coat for existing parking lots: ASTM D3320 and ASTM D490. Kamark No. 152 Driveway Seal Coat or approved equal. Apply at 5 gallons per 300 square feet per manufacturer's recommendations. Existing lots

receiving seal coat that are immediately adjacent to buildings must be properly closed off to pedestrian traffic to avoid tracking of sealer into buildings.

**TABLE 5**

MIXTURE NUMBER	13A MOD.	36A MOD.
VMA% (eff. Spec. gravity)	15.5	16.5
Air Voids %*	2.5*	2.5*
Fines to binder ratio (max.)	1.2	1.2
Fine angularity min. MTM117	2.5	3.0
L.A. Abrasion % Max.	40	40
Soft Particle % Max.	8	6*
<b>GRADATIONS</b> - Percent passing indicated sieve		
1"	100	100
$\frac{3}{4}$ "	75-95	100
$\frac{1}{2}$ "	60-90	92-100
3/8"	45-80	65-90
#4	30-65	55-75
#8	20-50	-
#16	15-40	25-45
#30	10-25	-
#50	5-15	-
#100	3-6	-
#200	3-6	3-7
Crush (min) MTM 18	50*	60
* Modified from MDOT Specs.		

**32 12 43 POROUS FLEXIBLE PAVING**

- 1 Parking Lot (Porous Pavement only) Bituminous materials: Shall comply with the following:
  - A Asphalt Cement; Performance grade 64-28 with at least 5% SBS or SBR modifier by weight of asphalt cement. A drain down test shall be run on the approved mix with a maximum of 0.3% loss being acceptable.
  - B Asphalt Film Thickness: 15 to 17 microns.
  - C Air Voids: Minimum of 17%
  - D Los Angeles Abrasion (MTM 102): 45% maximum
  - E Crushed: 90% minimum
  - F Aggregate in porous pavement: Shall comply with the sieve and gradation limits shown in Table 6 below:

**TABLE 6: POROUS PAVEMENT AGGREGATES**

	1"	$\frac{3}{4}$ "	$\frac{1}{2}$ "	3/8"	#8	#200	LBW
Porous Pavement	100%	92-97%	80-90%	60-70%	5-10%	0-5%	0-2%

**32 13 00 RIGID PAVING**

**32 13 10 CONTINUOUS REINFORCED CEMENT CONCRETE PAVEMENT**

- 1 Pedestrian and medium weight vehicular walkways: Our current walk construction is 6" concrete sub-base material as defined in Section 32 11 16 of this standard.. Provide fiber reinforcing in the concrete. See Appendix C, Standard Details 32.001, 32.002, and 32.003.
- 2 Heavy weight<sup>1</sup> vehicular walkways: To be 7" concrete over sub-base and aggregate base materials as defined in Sections 32 11 16 and 31 11 23 of this standard. Provide welded wire mat reinforcing, W 6x6 2.9/2.9 in the concrete. See Appendix C, Standard Detail 32.001.
- 3 Do not use exposed aggregate concrete paving.
- 4 Shortcuts: Be aware that pedestrians take the shortest route between two points when planning walk layout. Consider potential shortcuts and provide walks to meet this need. This includes even the shortest right angle conditions. Landscape planting can in some cases prevent this but it must be extremely dense and functional winter and summer
- 5 ADA: We have a commitment to provide for barrier-free access to all parts of the development. Curb cuts should be a minimum of 8 feet wide at the low point to allow for snowplow blades. Review grade slopes and cross slopes for compliance. See Appendix I.

**32 14 00 UNIT PAVING**

**32 14 13 PRECAST CONCRETE UNIT PAVING**

- 1 For snow removal, walks are accessible to trucks. In certain parts of campus, GVSU is using concrete paving brick as either edging or as complete walks and will advise as project proceeds.
- 2 When pavers are used they are to be placed on top of a 6-inch thick concrete pour.
- 3 Walks shall be 8 feet wide minimum. Review radius and intersections with GVSU. Snow removal by trucks and access by emergency vehicles is a consideration on GVSU sidewalks.

**32 14 16 BRICK UNIT PAVING**

- 1 Shall not be used.

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<sup>1</sup> Heavy weight is for paved surfaces receiving steady and frequent vehicles with heavy loads such as semi-tractor - trailer deliveries. Some locations for use are loading docks, driveways to and from loading docks or other areas that will receive such traffic. All other locations are considered pedestrian/medium weight.

### **32 16 00 CURBS AND GUTTERS**

#### **32 16 13 CONCRETE CURBS AND GUTTERS**

- 1 Concrete curbing shall be per Appendix C, Standard Details 32.008, 32.009 and 32.010.

### **32 17 00 PAVING SPECIALTIES**

#### **32 17 23 PAVEMENT MARKING**

- 1 Parking Stalls and related line work, roadway centerlines: Yellow waterborne paint per MDOT 920. Handicap accessible spaces shall be painted blue.
- 2 Cross walks, turn arrows, stop bars: White waterborne paint per MDOT 920.

## **32 30 00 SITE IMPROVEMENTS**

### **32 35 00 SCREENING DEVICES**

#### **32 35 10 EARTH BERMS**

- 1 All parking areas shall be shielded by landscaped berms. Berms shall be of a height sufficient to cover the headlights of parked automobiles. Berms shall allow mowing with "riding" mowers with 72" decks. Maximum slope 1:3. Sections and elevations are needed that show the relationship between berms, cars and the surrounding topography.

#### **32 35 13 SCREENS**

- 1 Screen walls that surround trash dumpsters shall:
  - A Be of adequate height to visually conceal dumpster and allow for overflowing trash.
  - B To be of brick masonry on exterior with concrete block back-up, with stone or architectural concrete cap with base flashing.
  - C Have solid vinyl gates, paired with gate bolts and latch to secure with University BEST pad locks.
  - D Interior to be 6 inch concrete slab.
  - E Interior block walls to be painted.
  - F Provided with front concrete apron the width of gate opening plus two (2) feet each side beyond opening and a minimum of six (6) feet deep.

## **32 80 00 IRRIGATION**

### **32 84 00 PLANTING IRRIGATION**

#### **32 84 23 UNDERGROUND SPRINKLING**

- 1 Irrigation: Project should include irrigation system for lawn areas.
- 2 Provide new or where possible (verify capacity) tie into existing systems.
- 3 System shall be tagged to allow location of buried pipes.
- 4 Temporary piping, valving and other connections necessary to keep portions of existing system operational during construction shall be required as part of the project.
- 5 Provide final record drawings showing all revisions to originally planned and existing systems

- 6 All irrigation mains shall be run with copper tracer wire for future location detection. Wire shall run full length of all mains and primary branch lines (all pvc lines) and be accessible at controller box and all valves located within main and primary branch lines.
- 7 Provide, as part of the construction documents a irrigation demolition plan, when required by the project, clearly delineating existing mains, branch lines, heads and control valves that are to be removed, removed and salvaged and how other sections of the remaining system are to be re-plumbed to remain in operation during construction and prior to installation of the final system.

## **32 90 00 PLANTING**

- 1 The University is particularly concerned about the appearance of the campus at the start of fall term. Installation of landscaping shall be planned so that there is a finished appearance at the start of fall term.

### **32 91 00 PLANTING PREPARATION**

#### **32 91 13 SOIL PREPARATION**

- 1 For proper plant growth, existing or imported soil shall be reviewed and/or tested to determine its condition and type. No soils permitted with chemical contamination.
- 2 Landscape installer shall be required to amend soil to meet planting requirements. Replace or amend soils with composted soil at rate determined by testing and approved by University.
- 3 For rain gardens, direct contractor to use "Biomass Blend" soil mix, as provided by Compost Soil Technologies. Soil mixture contains compost, washed sand, and topsoil. The blend shall not contain more than 5% clay or silt and must have 8% or more organic material. After soil mix has been placed in the rain garden areas, contractor must protect these areas with 4-foot high snow fencing at the boundaries to prevent any compaction by heavy equipment. If any compaction occurs, the responsible contractor will be required to remove and replace the soil at their cost.

### **32 92 00 TURF AND GRASSES**

#### **32 92 19 SEEDING**

- 1 Seed mixtures provided shall meet the following specifications:
- 2 For Premium Lawns: Landscaper Plus Mixture:
  - A 30% Park Kentucky Bluegrass
  - B 30% Jasper Creeping Red Fescue
  - C 15% Cutter Perennial Ryegrass
  - D 15% Edge Perennial Ryegrass
  - E 10% Express Perennial Ryegrass
- 3 MI Roadside Mixture:
  - A 50% Perennial Ryegrass
  - B 30% Creeping Red Fescue
  - C 15% Kentucky Bluegrass
- 4 For Sports Turf Lawns:
  - A 25% Merit Kentucky Bluegrass
  - B 25% Dragon Kentucky Bluegrass
  - C 25% Wizard Perennial Ryegrass
  - D 25% Quest Perennial Ryegrass
- 5 Construction contractor shall protect newly seeded areas from pedestrians or vehicular traffic.
- 6 New Seeded Lawns: Landscape contractor is to provide a minimum of three (3) mowings for new lawns,

### 32 92 23 SODDING

- 1 Contractor shall keep newly laid sod watered and green. If irrigation system is not operable, Contractor shall water manually, with portable water tank provided by Contractor, as conditions required.
- 2 New Sodded Lawns: Landscape contractor is to provide a minimum of three (3) mowings for new lawns,

### 32 93 00 PLANTS

- 1 New Plant Warranty: All new plants shall be supplied with a warranty, which requires first year care. This care includes watering, storm damage pruning, removal of cabling or guying wire, mulching, staking, and first season perennial cut back. This warranty shall continue through 2 leaf outs and 2 leaf drops for all perennial plantings.
- 2 Use of the following list of plant materials may be "unacceptable" for planting in certain areas or locations around the various GVSU campuses, and will be subject to review and approval from the Grounds Supervisor, or an authorized representative of the University:
  - A Azalea
  - B Boxwood
  - C Euonymous
  - D Heather
  - E Holly (blue or green)
  - F Leucothoe
  - G Pieris
  - H Rhododendron
  - I Juniper
  - J Yews
  - K Grafted or "specialty" plants.
  - L Ground cover plants such as Bugleweed (*ajuga* sp.), Wintercreeper (*Euonymous* sp.), Ivy (*Hedra* sp.), Dead Nettle (*Lamiastrum* sp. And *amium* sp.), Lily-turf (*Liriope* sp.), Pachysandra (*Pachysandra* sp.), edum (*Sedum* sp.), and Myrtle (*Vinca* sp.).

### 32 93 33 SHRUBS

- 1 Shrub installation shall be in accordance with Standard Detail #32.005 in Appendix C of this manual.

### 32 93 43 TREES

- 1 Holes will be dug 3 feet larger, in horizontal diameter than the root ball of the new or transplanted tree. The shape of the hole shall be in the form of a shallow dish, allowing 2-3 inches of the root ball to be above the ground line. All burlap shall be removed to expose the root ball dirt and as much of the wire basket cut away. Once the tree is in the hole, return excavated material back around the root ball, then apply 3 inches of shredded bark mulch over excavated root ball area. Make sure that there is no excessive amount of mulch resting up against the trunk of the tree so that butt rot does not take place. Do not fertilize the tree with a quick release fertilizer.
- 2 Restricted Tree Species: These species will never be planted on any campus of GVSU. These plants are Scotch pine (*Pinus sylvestris*), Austrian pine (*Pinus nigra*), European birch (*Betula pendula*), boxelder (*Acer negundo*), and Ash (*Franxinus* sp.).
- 3 New Tree Size: For GVSU Allendale Campus projects tree size shall be selected so that a balanced site plan is immediately presented. For budget development, assume trees to be 4 to 6 inches in diameter.

- 4 New plant specs: all tree stock will have a single stem, unless otherwise called for by the plan. Tree specimens will not be accepted if there is trunk wounding, broken leader(s), excessive broken branches, loose root ball, or generally in poor health. Tree size shall be selected so that a balanced site plan is immediately presented. For budget development, assume trees to be 4 to 6 inches in diameter.
- 5 Protection: For existing, transplanted and new trees, protect root zone (1 ½ times tree height) from compaction by fencing this area around tree. When protection of this size area is not permissible protect minimum area equal to the trees drip line. See Appendix D, GVSU Bulletin #285.
- 6 Finishing: all trees will be staked, opposite each other, parallel with the prevailing winds (south/south west) to keep the tree from tipping over. Do not guy tree with anything that screws or punctures the tree trunk. Prune all broken branches back to the first live bud or fork if it is a very large limb. Refer to Standard Detail #32.004 in Appendix C of this manual.
- 7 New Tree Warranty: Warranty shall continue through 2 leaf outs and 2 leaf drops. Any replacement trees shall be warranted under the same provisions starting at from the time of the replacement planting, All trees have to be in a healthy growing state, as determined by GVSU's arborist. Trees determined to be unhealthy shall be replaced under terms of the warranty.

## 32 94 00 PLANTING ACCESSORIES

### 32 94 43 TREE GRATES

- 1 Tree grate installation (where used in the City of Grand Rapids) shall be in accordance to Standard Details 32.006 & 32.007 in Appendix C of this manual.

## 32 96 00 TRANSPLANTING

### 32 96 43 TREE TRANSPLANTING

- 1 Tree Transplants: At all construction sites, review sites with GVSU Arborist for transplant opportunities. Tree spade should be used for removal and transplant of selected trees. For all trees, a 90-inch tree spade is required. Permanent removal of trees requires executive approval and must be discussed during initial site planning.
- 2 If irrigation is not present transplant trees and shrubs only from April 1 to May 30 or Sept. 1 to Nov. 25.
- 3 There shall be no large trees planted near building entrances. All trees need to be a minimum of 20'-30' from all entrances. Smaller or dwarf ornamental trees can be considered for plantings close to entrances and must be approved by the Arborist. After transplanting, trees must be watered 2 times a week at the minimum, by the contractor if irrigation is not present or if it has not rained over a half an inch that week. When trees are removed for future relocation, and stored temporarily, they should be 'heeled' in and watered on a daily basis by the Contractor. Care must be taken during digging operations to avoid damage to underground utilities. Contact GVSU Dig and Miss
- 4 Dig for all tree transplants and installations. Only quality stock shall be transplanted. Lesser species, usually fast growing hardwoods/softwoods, shall not be transplanted. The proposed transplant/relocation plan shall be reviewed with GVSU staff. Orientation (north/south) to be maintained at the transplant location.

END OF SECTION