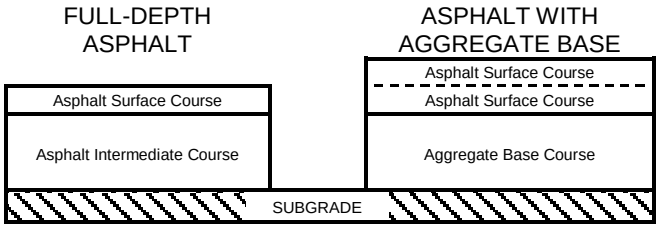
SECTION 2.4
RESIDENTIAL DRIVEWAYS

Asphalt concrete pavement is a popular choice for residential driveways. Properly designed and constructed, it stays smooth, sound and attractive in appearance over many years. Flexibility allows the pavement to conform to minor subgrade settlements and still retain a continuous surface free of abrupt bumps.

Either a full-depth asphalt or an asphalt with an aggregate base design may be used for this purpose. One may be better suited than the other to a given situation. The design and construction of both are discussed in the following paragraphs. Sample specifications are provided for reference in Section 3 of this guide.



RECOMMENDED MINIMUM THICKNESS DESIGNS
INCHES AND (MILLIMETERS)

SUBGRADE SUPPORT	FULL-DEPTH ASPHALT	WITH AGGREGATE BASE AGGREGATE	ASPHALT
POOR (CBR 3)	5.5 (140)	6 (150)	3 (75)
FAIR (CBR 5)	4.5 (115)	4 (100)	3 (75)
GOOD (CBR 7)	4.5 (115)	4 (100)	3 (75)

SUBGRADE SUPPORT CAPACITY

The subgrade is the prepared soil foundation for the pavement structure. Pavement thickness design starts with a realistic value for the load support capacity of the subgrade. The pavement then is made thick enough so that load pressures transmitted to the subgrade are reduced to a level consistent with subgrade support capacity.

Values in the table represent the support capacity of a range of fine grained soils often encountered in Ohio. Coarse grained soils (very sandy or gravely soils) will have higher support capacities; but, the minimum recommended thickness of asphalt concrete should be used for resistance to climatic stresses. The descriptions indicate the relative firmness the soil retains after it has been compacted and then exposed to the influx of moisture. The CBR, (California Bearing Ratio) value is a laboratory test measure of that quality.

An estimate of the relative firmness the soil retains under wet conditions may suffice for small driveways on well-drained sites. Moderate to large projects often warrant a professional investigation of subsurface soils and moisture conditions. The purpose is to identify conditions that may affect the overall design as well as to determine soil support capacity for pavement thickness design.

PAVEMENT THICKNESS AND MATERIALS

The minimum thickness recommendations in the table are suitable for the cars and light trucks plus the occasional heavier service and delivery trucks normal to the single unit residence.

The asphalt concrete mixtures recommended for use are ODOT standard construction specification Item 441, Asphalt Concrete Intermediate Course, Type 2 and Flexible Pavements of Ohio (FPO) specification 404LVT, Asphalt Concrete , for the surface course. These materials are described and some suggestions for specifying them are found in the FPO Technical Bulletin, "Specifying Asphalt Pavements in Ohio," on the FPO website, www.flexiblepavements.org.

For full depth designs, a 1.5 inch (38 mm) Item 404LVT with Item 441, Type 2 as a base is recommended.

For aggregate base designs, two 1.5 inch (38 mm) layers of Item 404LVT are recommended.

The aggregate base recommended is ODOT Item 304. The material is a high quality, dense graded, crushed aggregate. The particle size gradation should be uniform from coarse to fine and the upper limit on the very fine fraction (passing the No. 200 sieve) should not be exceeded. An excess of that fraction will weaken the base under wet conditions.

METRIC LAYER THICKNESS--Layer thickness in millimeters was converted from inches and then indicated according to the practice adopted by the Ohio DOT. That practice is to specify layer thickness less than 45 millimeters to the nearest millimeter and thickness greater than 45 millimeters to the nearest 5 millimeters.

DRAINAGE

The pavement surface should slope not less than a quarter inch per foot (6 mm per 300 mm) for good surface water drainage. The direction of the slope should be in keeping with the surrounding area and may be either from side to side, end to end, or for extra wide drives from the centerline to the sides.

If a poorly drained area cannot be avoided, the subgrade may need to be built up and pipe underdrains may need to be installed. Perforated pipe made for that purpose is placed in a trench a foot (300 mm) more or less below the subgrade surface and backfilled with porous aggregate up to the subgrade surface. A suitable outlet for the pipe to a catch basin or ditch is needed.

SUBGRADE PREPARATION

Top soil, roots, boulders and the like always should be removed before starting subgrade preparation. Suitable subgrade soil then should be compacted thoroughly even though it may already appear to be firm. Appearance can be misleading. Most fine grained soils are firm when dry,

whether compacted or not. If not well compacted, they become very soft when exposed to the influx of moisture.

Compaction is best achieved when the soil is at its optimum moisture content for compaction. Either aerating or adding and mixing water into soil often is necessary. At optimum moisture content for compaction, a handful of soil can be squeezed into a firm ball. If the soil is too dry, the ball will crumble easily and if too wet it will be soft and plastic.

While good judgment may suffice for small projects, compaction generally should be determined by testing. The test method commonly used for moisture-density determinations is AASHTO T-99.

Soil in areas that still is soft or yielding after compaction should be removed and replaced with suitable soil or aggregate base to a depth of at least 6 inches (150 mm). The subgrade surface should be at proper elevation and cross-slope before paving starts. There should be no loose material or low areas where water would accumulate and soften the subgrade beneath the pavement.

AGGREGATE BASE CONSTRUCTION

Aggregate should be placed by means of a mechanical spreader except on small jobs where only hand placing may be practical. In either case, blading or raking should be done with care to avoid separation of particle sizes.

Thorough compaction is important and is best accomplished when the aggregate contains enough moisture to be quite damp. Compaction using a roller or plate vibrator should be continued until the base is very firm.

ASPHALT CONCRETE CONSTRUCTION

Standard practice in Ohio is to place asphalt concrete by weight per unit of area rather than to an actual compacted thickness. This makes it easy check the rate of placing and the total quantity placed using load delivery ticket weights.

Weight to volume conversion factors are included in specifications. For mixtures with gravel and crushed stone aggregates the factor is 111 pounds per square yard per inch of thickness (2.37 kilograms per square meter per millimeter of thickness).

Asphalt concrete should be placed by means of an asphalt paver. These are available in a range of sizes. Hand placing, although satisfactory when skillfully done, should be limited to small areas.

Both placing and compaction by rolling must be completed while the asphalt is hot and workable. Thin layers lose heat rapidly after spreading onto a cool surface and the time available for effective rolling then may be less than 10 or 20 minutes. For that reason, placing and rolling always should be done as a continuous process.

TACK COAT

Individual layers must be bonded together for the total thickness of asphalt to act as a structural unit. Unless a layer is placed upon a freshly placed layer, the surface of the previously placed layer should be cleaned of all foreign material and a liquid asphalt tack coat should be applied to it.