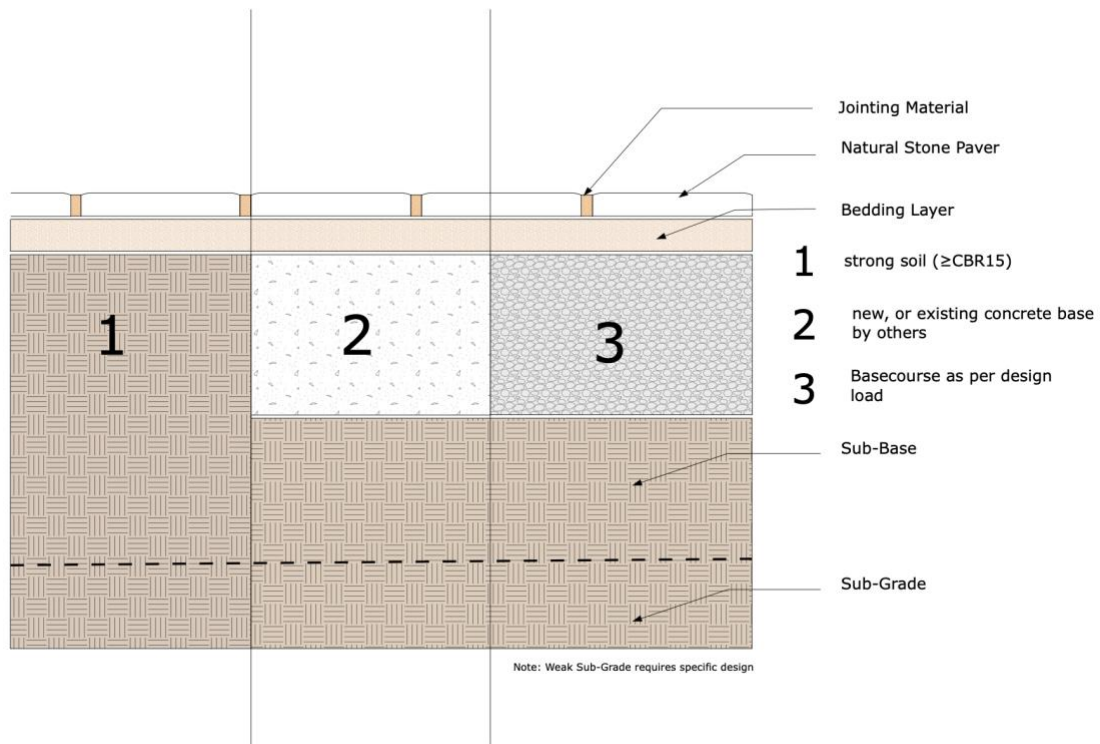


## Installation Guide for 20mm Natural Stone Pavers

It is crucial that the installation process be undertaken in consultation with a professional, be it an engineer, architect, or landscape architect, to ensure adherence to local council requirements and project-specific conditions. The design of the pavements should be conducted under the guidance of a qualified civil engineer according to the NZS 3116:2002 standards.

### Cross Section of typical Pavement to NZS 3116:2002



**Jointing Material** The jointing material is usually grout

**Bedding Layer** – Natural Stone Pavers are bedded on a 30mm layer of mortar

**Basecourse** The structural layer underneath the bedding layer. Pavers can be laid on existing or new concrete, or strong soil

**Sub-Grade** The undisturbed soil at the bottom.

The strength of this influences the thickness of the basecourse

**Sub-Base** GAP40 or GAP65 to create a stable base  
If the sub-grade is too weak

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## Product Specifications

Urban Paving's Natural Stone Paving Range with various surface finishes are designed to elevate the aesthetic and functional appeal of any outdoor space. Our Natural Stone Paving are cut from natural granite, or Indian Sandstone. The range of finishes provide a sleek and contemporary look ideal for various applications. These Natural Stone Pavers are perfect for residential patios, or general light traffic areas. The manufacturing process ensures they can withstand significant foot traffic and weather conditions, making them a versatile choice for both aesthetic and practical outdoor projects.

### 1. Sizes and Textures Available

#### Bluestone

Size (mm)	Thickness (mm)	Number per m <sup>2</sup>	Weight per Paver (kg)	Number per Pallet	Weight per Pallet (kg) <small>*excludes pallet weight</small>
900 x 600	20	1.85	31	50	1550
600 x 600	20	2.78	21	50	1050
600 x 300	20	5.56	10	100	1000

#### Bluestone Other

	Size (mm)	Thickness (mm)	Edge (mm)	Weight per Paver (kg)	Number per Pallet	Weight per Pallet (kg) <small>*excludes pallet weight</small>
Drop Face	600 x 400	30	30/60	22	40	880
Drop Face	600 x 300	30	30/60	17	50	850
Corner internal	480 x 480	30	30/60	20	40	800
Corner external	400 x 400	30	30/60	14	40	560

#### Granite

Size (mm)	Thickness (mm)	Number per m <sup>2</sup>	Weight per Paver (kg)	Number per Pallet	Weight per Pallet (kg) <small>*excludes pallet weight</small>
600 x 600	20	2.78	21	40	840

#### Granite

	Size (mm)	Thickness (mm)	Edge (mm)	Weight per Paver (kg)	Number per Pallet	Weight per Pallet (kg) <small>*excludes pallet weight</small>
Drop Face	600 x 400	30	30/60	23.5	40	940
Drop Face	600 x 300	30	30/60	18	50	900
Drop Face Corner (internal)	480 x 480	30	30/60	21	40	840
Drop Face Corner (external)	400 x 400	30	30/60	15	40	600
Double Pencil Edge	600 x 300	30	30	16	70	1120

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## 2. Performance Metrics

For individual product performance to NZS3116:2002 please refer to the technical data sheet of the respective product. The full list can be found on our website.

## Site Preparation

### 1. Sub-Grade

The subgrade's surface finish should be +0, -20 mm for level at a point, and should not deviate more than 15 mm from a 3-meter straightedge or template in any direction. It's important that the subgrade doesn't pond water.

For smaller residential projects, a uniform, well-compacted subgrade will usually be sufficient. Just make sure to follow the guidelines for compaction and strength checks. If you're laying the bedding layer directly on the subgrade, the tolerances are the same as for the basecourse.

For sub-grade load checks refer to Table 3.1.

### 2. Sub-Base

For very weak soils, or low graded CBR's the use of AP40 can help create a stable sub-base layer.

### 3. Basecourse

#### Basecourse Material

The basecourse shall comply with NZS3116:2002 Section 308.

#### Basecourse indicative thickness

Base course thicknesses are indicative only and are provided to give an example of typical construction. This table does not replace the use of engineering advice.

Natural Stone pavers up to 20mm thickness are typically used for light-duty applications such as pedestrian walkways, patios, and garden paths only.

Table 3.1	Subgrade Classification		Basecourse Thickness
	CBR (California Bearing Ratio)		
<b>Residential Pedestrian</b> Patio/Pathway	Weak Soil	CBR 4	50mm
	Medium Soil	CBR7	50mm
	Strong Soil	CBR15	No basecourse needed, but must comply with Sub-Grade finish
<b>Residential Light Traffic</b> Single Unit Residential Driveways	Weak Soil	CBR 4	100mm
	Medium Soil	CBR7	75mm
	Strong Soil	CBR15	50mm
<b>Residential Light to Medium Traffic</b> Multi-Unit Residential Driveways	Weak Soil	CBR 4	180mm
	Medium Soil	CBR7	125mm
	Strong Soil	CBR15	75mm
<b>Public Footpath</b> High and Low Impact	Weak Soil	CBR 4	75mm
	Medium Soil	CBR7	50mm
	Strong Soil	CBR15	No basecourse needed, but must comply with Sub-Grade finish

There are three types of soil classifications called weak, medium and strong. These are also classified using the California Bearing Ratio, or CBR (Section 6.1, NZS4402)

For small residential projects you can check these on site by walking on dampened or wetted ground. Your foot imprint is going to tell you what you need to know: weak - leaves strong imprint, medium - heel pressure leaves an imprint, strong - no imprint. For larger projects determine the on-site sub-grade CBR value use the Scala Penetrometer Test as per NZS 4402:1986

Slopes greater than 12% require specific design

#### 4. Bedding Layer

Natural Stone pavers are bedded on a 30mm layer of either sand (when compacted) or mortar.

The bedding sand shall comply with NZS3116:2002 Table 4 Sand category III residential, residential driveways and public footpaths.

BS sieve size	Percentage by mass passing		
	Sand category I	Sand category II	Sand category III
5.00 mm	90 to 100	89 to 100	89 to 100
2.36 mm	75 to 100	65 to 100	65 to 100
1.18 mm	55 to 90	45 to 100	45 to 100
600 µm	35 to 65	25 to 80	25 to 80
300 µm	10 to 45	5 to 48	5 to 48
150 µm	0 to 10	0 to 15	0 to 15
75 µm	0 to 1.5	0 to 5	0 to 5 <sup>(1)</sup>

<sup>(1)</sup> For residential pedestrian applications, a 0-10% range can be used.

#### 5. Jointing Material

The jointing material can either be a sand or a grout.

The joint sand shall conform to NZS 3116:2002 Table 5 Other.

Sieve size	Roads and Industrial Pavements	Other
2.36 mm	100%	100%
1.18 mm	75 – 90%	75 – 100%
600 µm	55 – 80%	55 – 100%
300 µm	20 – 40%	15 – 60%
150 µm	5 – 15%	3 – 30%
75 µm	0 – 5%	0 – 5%

## Installation Steps

### 1. Urban Paving Bedding and Jointing Recommendations

For optimal results with 20mm natural stone pavers, installation on a solid base using a mortar bed is highly recommended. This approach provides a strong and stable foundation, enhancing the durability and longevity of the paved surface. Grouting the joints offers a secure, water-resistant seal, creating a refined finish that is both durable and easy to maintain. Following this method aligns with NZS3116 standards and ensures that the installation can withstand varying environmental conditions while maintaining its aesthetic and structural integrity.

### 2. Site Clearing and Excavation Techniques

Remove all existing vegetation, debris, and topsoil. Ensure the site is clear and level before excavation. Excavate to the required depth based on your load calculations, ensuring a uniform surface. Account for the total thickness of all layers, including the paver.

### 3. Base Preparation

Spread the basecourse material evenly, ensuring a consistent depth. Compact the base layer using a plate compactor to achieve a firm and stable base. Aim for a compaction level that ensures stability. Multiple passes with the compactor may be necessary.

Create a slight slope in the base layer to facilitate drainage. The slope should direct water towards natural drainage points or a subsurface drainage system. If necessary, install a subsurface drainage system using perforated pipes to manage excess water.

### 4. Bedding Layer

The recommended bedding is a fully supported sand-and-cement mortar mix (5 parts sand to 1 part cement) laid on a compacted base course or concrete pad.

#### Bedding Sand

Spread the sand loosely over the sub-base or the ground you've prepared. You'll want to use screeds to help level it out. Aim for a compacted thickness of about 30 mm. To make sure you're on track, compact the first few meters of the sand and check the surface levels. If it doesn't look right, just lift the pavers, adjust the sand by raking it, and

screed it again until it's spot on. Keep checking the levels as you go to make sure everything stays even. Oh, and if you're working on a wide area, like more than 5 meters, use some temporary boards to help keep the sand level while you work

### **Mortar**

When you're laying a mortar bed for the pavers, you want to spread the mortar evenly over the base. Start with a layer that's a bit thicker than what you need, since you'll press the pavers down into it. Use a trowel to smooth it out, making sure it's level. As you lay each paver, press it firmly into the mortar to make sure it sticks well and stays level with the others. Keep an eye on your levels as you go—if any pavers sit too high or low, just tap them gently or add more mortar as needed. And remember, work in small sections so the mortar doesn't dry out before you can set the pavers.

## **5. Laying the Pavers**

Ensure that the base is fully compacted and stable. Check for any soft spots or uneven areas. Plan the paver layout to ensure minimal cutting and optimal visual appeal. Mark reference lines using string and stakes.

Begin laying pavers at a corner or edge, working outward. Use a straight edge or string line to maintain alignment. Place pavers with a small gap (as specified in your jointing material instructions) to allow for jointing material. Ensure each paver is level with the adjacent ones, using a rubber mallet to tap them into place as needed.

Frequently check the alignment of rows and adjust as needed to maintain straight lines. For consistent joint spacing, use spacers or a consistent measuring tool.

Lay the pavers with an 8-15mm gap for grouting, which allows for minor variations in size and creates a better visual result.

Leave cutting of edge pavers until the end before jointing to ensure proper fit and finish. Urban Paving offers a cutting service, or you can hire an appropriate saw.

### **Mixing Pavers:**

For projects using multiple pallets of natural stone, mix pavers from different pallets to account for variations in colour, texture, and size. This helps create a uniform appearance as there will always be slight variations in each paver due to the natural properties of stone.

## **1. Jointing Materials**

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## Sand Jointing

After the pavers have been laid, sweep fine jointing sand over the surface, ensuring the sand fills the gaps between the pavers. Use a broom to spread the sand evenly across the surface, and repeat until all the joints are completely filled. Once the gaps are filled, compact the pavers using a plate compactor to ensure the sand settles firmly into the joints. After compacting, sweep additional sand over the surface to top up any joints that have settled during compaction. Repeat this process until the joints remain consistently filled.

- Tip: For best results, use polymeric jointing sand, which hardens after being wetted, providing increased durability and preventing weed growth.

## Grout Jointing

For a more permanent jointing solution, use grout between the pavers. Begin by mixing the grout according to the manufacturer's instructions, ensuring a smooth and consistent texture. Apply the grout using a rubber float or a squeegee, pressing the grout into the joints at a 45-degree angle. Work in small sections, and make sure all joints are fully filled. After filling the joints, use a damp sponge to wipe off any excess grout from the surface of the pavers. Allow the grout to dry according to the manufacturer's recommendations before walking on the pavers.

- Tip: Be mindful to clean off any grout from the surface of the pavers immediately, as grout can be difficult to remove once it dries.

When using a mortar mix, apply a bonding agent like **Cemkey Concentrate** to the back of the pavers to aid adhesion to the mortar, as natural stone is a porous material.

## 2. Finishing Touches

Use a wet saw or masonry saw to cut pavers to fit around edges or obstacles. Wear appropriate safety gear. Install edge restraints along the perimeter to prevent paver movement. Ensure that the edges are secure and level.

## 3. Cleaning and Initial Maintenance Tips

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Sweep the surface to remove any debris or loose sand. For polymeric sand, ensure the surface is clean before wetting. Apply a sealant if desired, following the manufacturer's instructions to enhance colour and protect the surface.

#### 4. Advanced Installation Tips for natural stone

For slopes, ensure that the base and pavers are installed in layers that follow the slope, using geogrids for added stability.

For curved areas, cut pavers as needed and lay them in a radial pattern, ensuring tight joints and consistent spacing.

When installing near tree roots, allow space for root growth. Use flexible edging to accommodate movement.

Mark and avoid utility lines. If necessary, reroute them before installation to prevent damage.

## Maintenance and Care

### Cleaning

Natural stone is porous and can absorb stains. It is important to remove any material likely to stain the pavers immediately. Over time, natural stone exposed to sun and rain tends to self-clean.

The best way to clean the stone is using a water-blaster or water with a stiff broom. It is advised **never to use hydrochloric acid** or other acids on natural stone, as they can damage the surface.

### Sealing

If there is a risk of ongoing staining, you may opt to seal the natural stone pavers. Sealing provides additional time to wash away stains before they become ingrained. Urban Paving recommends using **Dry Treat Stainproof** or **Dry Treat 40SK** (especially around saltwater pools) for sealing. Sealing helps reduce staining, fungal growth, and can enhance the stone's colour, but the pavers will still require cleaning and maintenance.

It is important to use a sealant that allows the stone to "breathe" and avoid using topical solvent sealers.

### Frost Resistance and Drainage

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Ensure that the pavers are laid on a free-draining base to prevent water accumulation ("wet feet"), which reduces the risk of frost damage. Proper drainage is essential for longevity.

### **General Considerations**

The pavers may contain naturally occurring elements like iron, which are not always visible at installation but do not affect the quality.

Regular maintenance includes clearing the paver surface of grout, mortar mix, or other cementitious materials to avoid difficulty in cleaning them later on.

## **Tools and Materials**

### **Tools**

- Measuring tape
- String line and stakes
- Rubber mallet
- Plate compactor
- Level
- Trowel and rake

### **Materials**

- Pavers (sizes as specified in our range)
- Jointing material, sand or grout
- Bedding sand, or mortar
- Crushed aggregate for base and sub-base layers, if applicable
- Geotextile fabric (optional)
- Edge restraints (e.g., plastic, metal, or concrete)

## **Reference Documents**

NZS 3116:2002 - Concrete Segmental and Flagstone Paving