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Specification for Road Works - Fencing and Environmental Noise Barriers

CC-SPW-00300

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This document has been authorised by the Director of Professional Services, Transport Infrastructure Ireland. For any further guidance on the TII Publications system, please contact the following:

Contact: Standards and Research Section, Transport Infrastructure Ireland
 Postal Address: Parkgate Business Centre, Parkgate Street, Dublin 8, D08 DK10
 Telephone: +353 1 646 3600
 Email: infoPUBS@tii.ie

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Contents

1. General.....	1
2. Requirements for Temporary and Permanent Fences.....	2
3. Temporary Fencing.....	3
4. Timber Quality.....	4
5. Fittings.....	5
6. Permanent Fencing.....	6
7. Permanent Fencing for Accommodation Works.....	9
8. Gates and Stiles.....	10
9. Removing and Re-erecting Existing Fences and Gates.....	11
10. Environmental Noise Barriers.....	12
11. Preservation of Timber.....	18
12. Painting of Timber Fences, Gates, Stiles and Posts.....	19
13. Concrete Fencing.....	20

**Updates to TII Publications resulting in changes to
Specification for Road Works - Fencing and Environmental Noise Barriers CC-SPW-00300**

Date: August 2018

Amendment Details:

This standard supersedes the January 2009 version of CC-SPW-00300. The principle changes are as follows:

- a) The standard has been updated throughout to account for the specification for the timber post and tension mesh fence details contained within CC-SCD-00320, CC-SCD-00321 and CC-SCD-00324.
- b) The standard has been updated to the TII Publications template and all references have been updated to TII Publications references.

Contents Table

1. General	1
2. Requirements for Temporary and Permanent Fences	2
3. Temporary Fencing	3
4. Timber Quality	4
5. Fittings	5
5.1 General.....	5
5.2 Flexible Rail for Timber Post and Tension Mesh Fence	5
6. Permanent Fencing	6
6.1 General.....	6
6.2 Roadside Permanent Fencing	6
6.3 Non-Roadside Permanent Fencing.....	6
6.4 Changes in Vertical Alignment.....	6
6.5 Changes in Horizontal Alignment	7
6.6 Mammal Resistant Fencing	7
6.7 Installation of Fencing on Undulating Ground.....	7
6.8 Installation of Fencing in Soft/Poor Ground Conditions	8
6.9 Retrofitting of Existing Timber Post and Rail Fencing.....	8
7. Permanent Fencing for Accommodation Works	9
8. Gates and Stiles	10
9. Removing and Re-erecting Existing Fences and Gates	11
10. Environmental Noise Barriers	12
10.1 General.....	12
10.2 Tolerances.....	13
10.3 Vandal Resistance.....	13
10.4 Aesthetics Requirements.....	13
10.5 Aesthetics Approval	13
10.6 Timber	13
10.7 Fittings	14
10.8 Concrete	14
10.9 Combination of Timber and Concrete	14
10.10 Steel	14
10.11 Brickwork	14

10.12 Other Materials	14
10.13 Design Requirements	14
10.14 Testing of Acoustic Performance	16
10.15 Insulation Requirements	16
10.16 Absorption Requirements	16
10.17 Mechanical Requirements	16
10.18 Post Foundations.....	16
11. Preservation of Timber	18
12. Painting of Timber Fences, Gates, Stiles and Posts	19
12.1 General.....	19
12.2 Priming	19
12.3 Undercoats and Finishing Coats.....	19
13. Concrete Fencing.....	20

1. General

Temporary and permanent fences shall comply with the requirements of this Specification, the associated guidance within CC-GSW-00300 and the TII Publications Series 300 Standard Construction Details (SCD).

2. Requirements for Temporary and Permanent Fences

As soon as the Contractor is in possession of any part of the Site, they shall immediately erect fencing on the boundaries of the land as shown on the drawings in the Contract. In places where permanent fencing cannot be erected immediately or where none is required, the Contractor shall erect, and when and where required, re-erect and maintain temporary fencing and subsequently take down and remove as necessary. The type of temporary fencing shall be chosen by the Contractor, unless otherwise described in Appendix 3/1, and should be selected from the standard types for road works shown in the TII Publications SCDs listed in Appendix 3/2, taking into account the usage of the adjoining land. Unless otherwise described in Appendix 3/1, the Contractor shall not use barbed wire in areas accessible to the general public. Access shall be made in temporary fencing as necessary for the use of the occupiers of adjacent lands.

Temporary fencing shall remain in position either until it is replaced by permanent fencing or until its removal on completion of the Works, unless otherwise described in Appendix 3/1.

When concrete for post footings is required, it shall comply with the Concrete for Ancillary Purposes section of CC-SPW-02600 Specification for Road Works Series 2600 - Miscellaneous.

3. Temporary Fencing

Temporary fencing shall be appropriate to the usage of the adjoining land and, unless otherwise described in Appendix 3/1, may be selected from the types included in the TII Publications SCDs listed in Appendix 3/2.

Where temporary fencing is to be located adjacent to any trafficked national road where there is a risk that an errant vehicle may reach it, the fencing chosen should be such that there are no horizontal rails and the posts do not present a hazard as defined in DN-REQ-03034 The Design of Road Restraint Systems (Vehicle and Pedestrian) for Roads and Bridges.

Should temporary fencing be removed temporarily for the execution of any part of the Works, it shall be reinstated as soon as possible and in the meantime, the gap in the fencing shall be patrolled so that no unauthorised entry on to adjoining land takes place and no stock escapes from the adjoining land.

Unless otherwise described in Appendix 3/1, timber for temporary fencing need not have preservation treatment.

4. Timber Quality

Timber for permanent fencing shall be one of the species referred to in IS 435-1 Clause 4.1 and Table 1.

Timber for permanent fencing shall be of appropriate natural durability as specified in Appendix B.1.5 of IS 435-1 and shall be referred to where natural durability is used as the criteria to achieve the desired service life. If additional treatment is required to extend the natural life, the timber shall be treated with wood preserve in compliance with Section 11 of this Specification.

Timber for permanent fencing shall comply with the grading requirements in IS 435-1 Clause 4.2 and Table 2.

Unless otherwise described in Appendix 3/1, timber for permanent fencing shall fully comply with IS 435-1 with the exception of the straining posts, cross members and bed logs specified for Timber Post and Tension Mesh Fencing within CC-SCD-00320, CC-SCD-00321 and CC-SCD-00324. These features are not specified within IS 435-1, however the timber for such features shall conform to the requirements contained within IS 435-1 for Timber Species, Timber Grading, Moisture Content, Geometry of posts and Timber Preservation.

Straining posts for Timber Post and Tension Mesh Fencing shall be 2500mm x 170mm (+/- 5mm) 'machined' posts with a regular cylindrical diameter. Irregular, "Cundy Peeled" or "Rough round" type posts are not permitted.

Where cutting of cross members is required in the end post assembly detail for Timber Post and Tension Mesh Fencing, cut ends shall be treated to meet the requirements of Section 11.

Field gates and posts, stiles, bridle gates and kissing gates shall comply with Section 8 of this Specification.

Timber and testing of timber for permanent fencing shall comply with the requirements of IS 435-1 and the requirements for Goods, Materials, Sampling and Testing within CC-SPW-00100 Specification for Road Works Series 100 - Preliminaries.

Timber for permanent fencing shall not be jointed.

Timber for permanent fencing shall be obtained from a sustainable source. The supplier shall supply evidence in the form of appropriate chain of custody certificates.

A satisfactory factory quality control scheme shall be required to ensure that all timber used for permanent fencing and for timber Environmental Noise Barriers meets the requirements of this Specification. The quality control scheme should reflect the nature of the raw material, the production process and the features associated with fencing production; in particular, the specific requirements of Section 11 Preservation of Timber.

Factory Quality Control System operated by the NSAI to ISO 9001 and made specific to the preservative requirements of IS 435 shall be considered to satisfy the above requirements.

5. Fittings

5.1 General

Bolts, screws and nuts shall comply with ISO 4016, 4018, and 4034, for ISO 898 property class 4.6 or 4.8 unless otherwise described in Appendix 3/1. Washers shall comply with BS 4320. Nails shall comply with clause 4.3.2 of IS 435-2. Bolts washers and nails shall be galvanised to comply with IS EN ISO 1461 unless they are stainless steel.

All fencing fittings for both Timber Post and Rail and Timber Post and Tension Mesh Fencing shall have a service life of 30 years (minimum) for all components.

5.2 Flexible Rail for Timber Post and Tension Mesh Fence

Flexible Rail required for Timber Post and Tension Mesh Stud Fence as per CC-SCD-00321 shall be black in colour.

Flexible rails shall be UV stabilised extruded polymer flexible rail with minimum 3 no. embedded wires with tensile strength 1235 to 1550MPa. Embedded wires shall be 2.5mm diameter and galvanised to IS EN 10244 Class A.

Flexible rails shall be attached to each post with hot dipped galvanised and powder coated steel brackets approved by the rail manufacturer. Each bracket shall be fastened to posts with 2 no. 2.5" exterior wood screws.

An inline or mounted tensioner shall be included every 100m or less to maintain tension through the flexible rail in line with the manufacturer's specifications. Additional tensioners shall be provided at changes of direction in the fence alignment or at points where they are required to remove slack from the flexible rail. The rail must be taut when installed and must be tensioned sufficiently so as to not flap in the wind.

Where it is necessary to join two sections of flexible rail, either a manufacturer approved joining buckle or crimping sleeve shall be installed.

Flexible rail shall be attached to end posts with either a manufacturer approved attaching plate or buckle.

6. Permanent Fencing

6.1 General

Permanent fencing shall comply with IS 435, this Specification, the TII Publications Standard Construction Details listed in Appendix 3/2 and the additional requirements described in Appendix 3/1.

All permanent fencing shall be erected to present a flowing alignment both in plan and elevation following approximately the level of the ground and the Contractor shall trim and level the ground along the line of the fence to ensure the quality of installation. The fencing shall be neatly and effectively joined to existing hedges, fences and to other structures and joined to parapets to comply with the TII Publications SCDs listed in Appendix 3/2. Additional fence posts shall be provided at fence junctions and at fence corners as detailed in the relevant SCD.

The timber species and preservation treatment of all timber members used in fencing shall comply with Sections 4 and 11 of this Specification and any additional stockproofing required shall be as described in Appendix 3/1. Painting, if required in Appendix 3/1 shall comply with Section 12 of this document.

6.2 Roadside Permanent Fencing

Permanent fencing adjacent to national roads shall be Timber Post and Tension Mesh Fence complying with this Specification and as per the TII Publications SCDs contained in Appendix 3/2. The details within CC-SCD-00320 Timber Post and Tension Mesh Fence or CC-SCD-00321 Timber Post and Tension Mesh Stud Fence shall be used as appropriate. Where such fencing is required to be mammal proof, it shall be as per CC-SCD-00324 Mammal Resistant Timber Post and Tension Mesh Fencing.

Tension within the fence shall be checked after installation as per the manufacturer's specification to ensure full fence performance is achieved to the satisfaction of the Employer's Representative.

6.3 Non-Roadside Permanent Fencing

Permanent fencing installed as part of a national road scheme which is not erected adjacent to the road such as for accommodation works may be Timber Post and Rail Fence with 4 rails complying with IS 435 or another appropriate fence type chosen from the TII Publications SCDs contained in Appendix 3/2. Where Timber Post and Rail Fence is used, both ends of rails shall be cross cut at right angles to the length of the piece.

6.4 Changes in Vertical Alignment

Where the cross-fall of the ground perpendicular to the line of the fence exceeds 1:4, then the permanent fencing shall be amended as per the following sub-sections.

6.4.1 Timber Post and Tension Mesh Fence

The height of Mesh shall be increased by 250mm and the straining posts & intermediate posts as detailed on the relevant SCDs shall be extended by 250mm above ground level.

6.4.2 Timber Post and Rail Fence

The post height shall be increased by a minimum of 250mm above ground level and an additional rail shall be added.

6.5 Changes in Horizontal Alignment

Where a change in the horizontal alignment of the line of a Timber Post and Tension Mesh Fence exceeds an angle of 30°, a 'Double End Post Assembly' will be required as per CC-SCD-320 and CC-SCD-321.

6.6 Mammal Resistant Fencing

6.6.1 General

Permanent Mammal Resistant Fencing shall comply with IS 435 where relevant and the TII Publications SCDs listed in Appendix 3/2. This fencing is intended for the containment of all mammals' incl. badgers and otters. The timber species and preservation treatment shall comply with Section 11 and any additional stockproofing required shall be as described in Appendix 3/1. Painting, if required in Appendix 3/1 shall comply with Section 12 of this Specification.

The excavated trench shall be reinstated with good quality clean fill material following installation of the mammal fencing.

6.6.2 Timber Post and Tension Mesh Fencing

Where mammal resistant tension mesh fencing is required, a flap section, attached and hinged to the main fencing mesh width, is to be included as per CC-SCD-00324.

Additional corrosion protection may be required to ensure a 30 year (minimum) lifespan based on the corrosion rating of ground conditions within the scheme. Wire shall be Zinc Aluminium Alloy (90% Zinc, 10% Aluminium) and Coating Weight to be increased if appropriate based on the corrosion rating of ground conditions in line with the manufacturer's recommendations.

Where mammal proofing is required next to an end/straining Post, the length of end/straining post shall be increased by 200mm (minimum) below ground to provide deeper embedment so the trenching does not undermine the strength and stability of the post. Where, due to ground conditions, it is not appropriate or possible to increase the length of the straining post, the post shall be backfilled with mix ST2 concrete in accordance with the requirements of IS 435:2 subject to the approval of the Employer's Representative. Over the last section of fence between intermediate and end post, the mesh shall be shaped so as not to interfere with the end post, cross member or bed log elements of the End Post Assembly as detailed in the relevant SCD.

6.7 Installation of Fencing on Undulating Ground

The Contractor shall trim and level the ground along the line of the fence to ensure the quality of installation where the installation of timber post and rail or timber post and tension mesh fencing is required over undulation ground conditions which may adversely affect the integrity of the fencing.

Where a loss of tension to the top or bottom of the mesh in timber post and tension mesh fence occurs due to multiple changes in vertical alignment of the ground profile, the Contractor shall install additional straining posts located at the peaks of high and troughs of low points and cut and re-tension fencing at the straining posts to maintain consistent tension in the fence.

Alternatively, the Contractor may reduce spacing of the intermediate posts to 2m to maintain consistent tension in the fence with agreement of the Employers Representative.

Further guidance is provided within CC-GSW-00300.

6.8 Installation of Fencing in Soft/Poor Ground Conditions

The installation of timber post and rail and timber post and tension mesh fencing in soft/poor ground conditions which may adversely affect the integrity of the fencing shall be as per the requirements of IS 435-2.

Where timber post and tension mesh fencing is to be installed in poor ground conditions that may undermine the performance and integrity of the fence, the Contractor shall take one of the following remedial actions as appropriate in agreement with the Employer's Representative. The appropriate action shall be determined through trial installations to assess the most appropriate solution.

- Reduce the spacing of intermediate posts from 4m to 2m through areas of poor ground.
- Replace the 2100mm x 150mm x 75mm intermediate posts with 2500mm x 170mm diameter straining posts until ground conditions allow for regular intermediate posts to support the tension within the fence.
- Excavate a 1m wide x 1m deep trench along the line of the fence through the poor ground conditions and reinstate with acceptable fill material. Install intermediate posts within the reinstated material.

Further guidance is provided within CC-GSW-00300.

6.9 Retrofitting of Existing Timber Post and Rail Fencing

Where retrofitting existing roadside timber post and rail fencing with timber post and tension mesh fencing and the timber posts are deemed to have a residual life of 10 years or greater and are well founded on suitable ground, a tolerance of +/- 100mm may be applied to the required spacing of the timber posts as detailed on CC-SCD-00320 and CC-SCD-00321 to allow reuse of the existing posts. The residual life of the posts shall be subject to the approval of the Employer's Representative.

Where installing a section of timber post and tension mesh fencing within an existing run of roadside timber post and rail fencing as part of retrofit works, a suitable start and finish point shall be chosen where possible such as a fence corner or change in direction. Where this is not possible, a start and finish point shall be agreed with the Employer's Representative.

7. Permanent Fencing for Accommodation Works

Permanent fencing shall be provided for accommodation works and shall comply with the requirements of this Specification, the associated guidance within CC-GSW-00300 and the TII Publications Series 300 SCDs and the particular requirements described in Appendix 1/15.

8. Gates and Stiles

Field gates and posts shall comply with the relevant TII Publications SCD listed in Appendix 3/2 for the appropriate gate type and the requirements of Sections 4 and 11 of this Specification. They shall be provided to the dimensions shown on the relevant TII Publications SCDs listed in Appendix 3/2. Painting, if required in Appendix 3/1, shall comply with Section 12 of this Specification.

Fittings for field gates shall be as shown on the relevant TII Publications SCDs listed in Appendix 3/2.

Stiles shall comply with BS 5709 and Sections 4 and 11 of this Specification. They shall be provided to the dimensions shown on the TII Publications SCDs listed in Appendix 3/2.

Concrete required for post foundations shall comply with the Concrete for Ancillary Purposes section of CC-SPW-02600.

Any additional stock proofing required to gates and stiles shall be as described in Appendix 3/1.

9. Removing and Re-erecting Existing Fences and Gates

Where required in Appendix 2/3, existing fences, gates and stiles, with posts shall be carefully taken down, laid aside, removed or later re-erected in compliance with Sections 6, 7 and 8 as specified in sub-Clause 201.6 of CC-SPW-00200 Specification for Road Works Series 200 - Site Clearance.

Fences, gates, stiles and posts which are to be re-erected shall have any existing paint removed and be prepared and treated to comply with Section 12 of this Specification.

Where required in Appendix 2/3 existing fences that are to be disposed of off-site, shall be disposed of in compliance with the Waste Management Acts and Regulations and the requirements of TII Publication GE-ENV-01101 The Management of Waste from National Road Construction Projects.

10. Environmental Noise Barriers

10.1 General

Environmental Noise Barriers shall be provided in accordance with Appendix 3/1 and the drawings in the Contract and shall consist of materials and be erected to standards described in this Section.

Environmental Noise Barriers shall achieve the performance criteria set out in the Contract Documents in accordance with I.S. EN 1793-1, I.S. EN 1793-2, I.S. EN 1793-3, I.S. EN 1794-1 and I.S. EN 1794-2 following the specifications outlined in I.S. EN 14388, this Section, and any additional requirements described in Appendix 3/1.

Environmental Noise Barriers are to be manufactured in a factory, where the barrier was developed and the factory shall be accredited to ISO 9001 for the manufacture of the specific noise barrier panel or components. No on-site assemblies of Environmental Noise Barrier panels are permitted.

Where the Environmental Noise Barrier is combined with a safety barrier, the safety barrier shall comply with CC-SPW-00400 Specification for Road Works Series 400 – Road Restraints Systems (Vehicle and Pedestrian), DN-REQ-03034 and IS EN 1317. Where an Environmental Barrier is connected to a safety barrier and may affect the performance of the safety barrier, this shall be treated as a modification to the safety barrier under EN 1317 and the effect on its CE Marking shall be considered.

Environmental Noise Barriers shall be subject to and comply with DN-STR-03001 Technical Acceptance of Structures.

Environmental Noise Barriers are to be designed to achieve a design life of 30 years.

Where the Environmental Noise Barrier is to be erected on an earthwork environmental bund, the bund shall comply with CC-SPW-00600 Specification for Road Works Series 600 – Earthworks Clause 619.

Where an Environmental Noise Barrier is erected on ground or any other surface which follows the longitudinal profile of the adjacent road or on existing ground or earthwork environmental bund which has a gradient of not greater than 1 in 50 along the line of the barrier, the top of the barrier shall follow a flowing vertical alignment. Where the earthwork environmental bund or original ground has a slope exceeding 1 in 50, the top of the barrier may be stepped, where permitted in Appendix 3/1. The minimum height of the barrier and the maximum step increments where steps are permitted, shall be as specified in Appendix 3/1. Where necessary the ground shall be excavated or filled and compacted in compliance with the appropriate Clauses in CC-SPW-00600. Any excavation required shall not affect the minimum height of the barrier as shown in Appendix 3/1. The gravel board or bottom edge of the barrier shall be buried to a depth of at least 50 mm.

Where an Environmental Noise Barrier has been installed on the top of a fill slope, over the edge drainage will not be permitted.

10.2 Tolerances

Tolerances shall be as follows:

- i. An Environmental Noise Barrier shall be erected along a line or smooth curve as indicated on the drawings in the Contract within a tolerance of ± 75 mm normal to the plane of the barrier; in addition, the horizontal deviation from the required positions at adjacent panels or posts shall not vary by more than ± 15 mm.
- ii. The top edge of the barrier shall be at the specified height above the road surface, existing ground or finished ground level of the earthwork environmental bund within a tolerance of ± 50 mm and the deviation from the required levels at adjacent panels or posts shall not vary by more than ± 15 mm.
- iii. Barriers shall be vertical unless otherwise stated in Appendix 3/1

10.3 Vandal Resistance

Environmental Noise Barriers are required to be vandal resistant. Vandal resistant Environmental Noise Barriers shall be constructed out of break-resistant panels that cannot be penetrated by hand held tools e.g. sharp knife, sledgehammer etc. Where applicable the Environmental Noise Barriers shall contain tamperproof screws.

Protection against damage to the insulation of absorptive Environmental Noise Barriers shall be provided. Where a steel mesh is used, this shall comply with Section 10.10.

Any Environmental Noise Barrier vandalised within the first 5 years of installation shall be replaced by a length equal to the original unbroken total length of barrier involved. The cost of the replacement barrier and any necessary jointing/termination shall be at the Contractor's own cost. An Environmental Noise Barrier shall be deemed vandalised if it has been damaged in such a way that its integrity to perform as a noise attenuating device has been compromised e.g. a hole in the barrier, absorptive material has been removed etc.

10.4 Aesthetics Requirements

Where there are particular aesthetic or graffiti resistant requirements for Environmental Noise Barriers, these shall be listed in Appendix 3/1.

10.5 Aesthetics Approval

Drawings demonstrating compliance with the aesthetics requirements listed in Appendix 3/1 shall be submitted to the Employer's Representative.

10.6 Timber

Timber for Environmental Noise Barriers shall be of appropriate natural durability or treated with wood preserve in compliance with Section 11. Appendix B.1.5 of IS 435:1 shall be referred to where natural durability is used as the criteria to achieve the 30-year design life.

Timber surfaces shall be sawn unless otherwise stated in Appendix 3/1.

10.7 Fittings

Fittings shall comply with Section 5 of this Specification unless otherwise stated in Appendix 3/1. Nails, staples and screws in timber shall be austenitic stainless-steel grade 302 or 304.

10.8 Concrete

Reinforced concrete components shall comply with the requirements of Annex A of BS 1722: Part 2.

10.9 Combination of Timber and Concrete

Timber cladding used to screen concrete panel barriers shall comply with BS 1722: Part 5 and Sections 4 and 11 of this Specification.

10.10 Steel

Steel posts and Environmental Noise Barrier members shall comply with the requirements in CC-SPW-01800 Specification for Road Works Series 1800 – Structural Steelwork and shall:

1. be hot dip galvanized to comply with CC-SPW-01900 Clause 1909, and either be:
 - c) painted with the flowing paint system to comply with CC-SPW-01900,
 - i) 1 coat of item 155
 - ii) 2 coats of item 14
 - iii) 2 coats of item 35 or Item 50

to achieve a minimum total dry film thickness of 200 microns, or

- d) plastic coated to comply with CC-SPW-02600 Clause 2604;
2. have improved atmospheric corrosion resistance complying with CC-SPW-01800 Clauses 1801 and 1803.

10.11 Brickwork

Brickwork shall comply with CC-SPW-02400 Specification for Road Works Series 2400 – Brickwork, Blockwork and Stonework.

10.12 Other Materials

Other materials, or combination of materials, shall comply with I.S. EN 1793 and I.S. EN 1794, this Section, and any additional requirements described in Appendix 3/1. Material used shall have a desired service life of 30 years.

10.13 Design Requirements

The Contractor shall submit documented evidence demonstrating how the barriers meet the specified standards and the documentation shall clearly indicate the absorptive performance where such barrier type is used and airborne sound insulation categories of the constructed barriers as outlined in I.S. EN 1793 –1 and I.S. EN 1793 –2.

Where absorptive barriers are used, they must have a minimum absorption index of A3 in accordance with I.S EN 1793: Part 1 and all barriers must have a minimum insulation performance of B3 in accordance with I.S. EN 1793: Part 2.

The following shall also be taken into account:

1. The Contractor shall when required in Appendix 3/1, erect 2 sample panels of barrier not less than 6 weeks before starting construction. One section shall show the horizontal elevation, the other a sloping elevation. Spacing of barrier posts shall be as described in Appendix 3/1. When Appendix 3/1 requires a safety barrier to be attached to the Environmental Noise Barrier, the safety barrier shall be supplied and fixed to the sample panels of the Environmental Noise Barrier. The sample panels shall be used as the standard, which must be maintained throughout the Contract.
2. The Contractor shall provide working drawings of the barrier arrangements and details of fabrication.
3. The Contractor shall submit the following to the Employer's Representative:
 - a) Where Appendix 3/1 requires compliance with the particular noise design commitments including where appropriate the Environmental Impact Statement, Schedule of Commitments, and any modifications and conditions imposed by An Bord Pleanála, documented, evidence demonstrating compliance.
 - b) Details of materials and components used in the barrier, including vandal and graffiti resistance,
 - c) Details of gates and methods of fixing where applicable.
 - d) Details of fixing to adjoining structures and parapets where applicable.
4. Fixings shall be fitted so that bolts either do not protrude on the traffic side, or only do so with a coach bolt head, a cup square head, or with a dome headed nut.
5. Fixings and fastenings used shall be designed to prevent wilful damage. The design and materials used shall also enable damaged components to be replaced.
6. Stepping of panels shall only be permitted as specified in Appendix 3/1 to be compatible with aesthetic requirements.
7. The design shall be such that movement due to change in moisture content, thermal effects or weathering will not reduce the acoustic attenuation of the barrier.
8. All joints shall be sufficiently masked by cover strips or rebated to ensure acoustic integrity.
9. The design shall ensure that all members of the barrier can drain freely and do not allow water to stand on their surfaces or within joints.
10. Where access gates are required in Appendix 3/1, their design shall be such that they blend unobtrusively into the barrier. They shall open away from the nearest carriageway and leave no gap when closed. The gates shall be self-closing by the provision of a heavy-duty spring and be secured as described in Appendix 3/1. In barriers up to and including 2.00 m high the top edge of the gate shall be at the specified height of the barrier. Gates in barriers over 2.00 m high shall be 2.00 m high and provided with a header panel to align with the top of the barrier. Where a gate is not to be provided, but a gap is to be left for access as described in Appendix 3/1, a length of barrier shall be erected behind the gap or an overlap provided sufficient to maintain the acoustic performance of the barrier.
11. When timber is used in the barrier fixings shall be such as to allow timber movement due to change in moisture content to be accommodated without inducing splitting.

10.14 Testing of Acoustic Performance

The complete form of construction proposed for an Environmental Noise Barrier shall have been tested at a laboratory that has been accredited to undertake acoustic testing in accordance with IS EN 1793.

10.15 Insulation Requirements

The overall performance characteristic DLR (Single number rating of airborne sound insulation performance expressed as a difference of A-weighted sound pressure levels, in decibels) determined in accordance with IS EN 1793: Part 2 and shall meet a minimum insulation performance of B3, unless otherwise stated in Appendix 3/1.

10.16 Absorption Requirements

The performance characteristic DL α (Single number rating of sound absorption performance expressed as a difference of A-weighted sound pressure levels, in decibels) determined in accordance with IS EN 1793: Part 1 shall meet a minimum absorption performance of A3, unless otherwise stated in Appendix 3/1.

10.17 Mechanical Requirements

The overall mechanical performance and stability, safety and environmental requirements shall meet the minimum requirements as outlined in IS EN 1794- Part 1 and IS EN 1794-Part 2.

The complete form of construction proposed for an Environmental Noise Barrier shall have been tested at a laboratory that has been accredited to undertake mechanical testing in accordance with IS EN 1794.

10.18 Post Foundations

Noise barriers may be supported on foundations comprising spread/pad footings, driven precast concrete piles, steel piles or bored cast-in-place piles.

Where spread/pad footings are used, the barrier should sit directly on the footing.

Where piles and piles caps are used, concrete /concrete composite barriers may sit on the soil. Non-concrete barriers shall sit on a concrete gravel board so that no part of the barrier is in contact with the ground. The gravel board shall be not less than 150mm deep and shall have a total thickness of not less than 50mm.

No gaps between barriers and foundations are permitted; therefore, no over the edge road drainage is permitted. However localised slots for water discharge are permitted to drain the verge adjacent to the barrier.

Noise barrier foundations shall be designed in accordance with Eurocodes and the relevant National Annex. They shall be checked for both serviceability and ultimate limit states, and designed to limit deflections as detailed below.

Where the barrier foundation is located on disturbed material, such as earth mounds, both initial and long-term soil parameters should be used in the design of the foundations.

For serviceability limit state, long term settlement and lateral movement of the barrier due to causes such as embankment consolidation, should be considered together with serviceability loads such as wind. For barriers at the edge of an embankment, foundation design should take into account the likely foundation movement. The total barrier deflection shall not exceed the following limits:

Limiting Structural Deflection of Environmental Noise Barriers		
Element and Position	Direction of Deformation	Maximum deflection
Top of Post and Barrier	Horizontal Δx or Δy	1/200 of height
Straightness in Plan	Length of barrier	1/300 of barrier length over 10m
Straightness in elevation	Length of barrier	1/300 of barrier length over 10m

- i. Where stated in Appendix 3/1 the Contractor shall provide test equipment and carry out loading tests on post foundations as described in Appendix 3/1. The results shall be available at least one week prior to installation of the relevant length of fence, unless otherwise stated in Appendix 3/1.
- ii. The Contractor shall install foundations for testing after completion of the finished ground.
- iii. On completion of loading tests, the Contractor shall remove the test posts and foundations and make good the finished ground, unless the posts and foundations have not exhibited failure and can be incorporated into the permanent Works.
- iv. The Contractor shall establish and maintain appropriate traffic safety and management measures complying with CC-SPW-00100 Clause 117 during installation, loading and removal of the test posts and foundations.

11. Preservation of Timber

Prior to preservation treatment, the timber quality for all timber shall comply with Section 4 of this Specification.

In accordance with Clause 4.8 and Annex B of IS 435-1, the preservation of timber for permanent roadside fencing shall be carried out to achieve a desired service life of 30 years.

Unless otherwise specified in Appendix 3/1, the preservative used shall comply with requirements of IS 435 and the Biocides Product Directive (98/8/EC).

Timber that is required to be subsequently painted with creosote, shall be first primed in compliance with sub-Section 12.2.

12. Painting of Timber Fences, Gates, Stiles and Posts

12.1 General

Painting shall be carried out in accordance with the recommendations in the Code of Practice BS 6150.

All timber fabricated into units before delivery to the Site and which is required to be painted shall be primed at the point of manufacture.

12.2 Priming

Surfaces of wood should be clean and dry before being primed with priming paint complying with BS 7956:2000 or ready mixed aluminium priming paint complying with BS 4756.

12.3 Undercoats and Finishing Coats

After erection, all exposed primed surfaces shall be painted with two coats of undercoat as described in Appendix 3/1.


One finishing coat of the colour and type described in Appendix 3/1 shall be applied.

13. Concrete Fencing

Concrete fencing shall comply with IS 252, the TII Publications SCDs listed in Appendix 3/2 and the additional requirements described in Appendix 3/1.

Concrete fencing shall not be used for road side fencing adjacent to National Roads.



 Ionad Ghnó Gheata na Páirce,
Stráid Gheata na Páirce,
Baile Átha Cliath 8, D08 DK10, Éire

 Parkgate Business Centre,
Parkgate Street,
Dublin 8, D08 DK10, Ireland

 www.tii.ie

 info@tii.ie

 +353 (01) 646 3600

 +353 (01) 646 3601