

Departure from Standard Application

D-001: Reduced stopping sight distance and crest K value at VC3 (Ch 1+120-1+240) – GG 101 format

Project	A999 Example Junction Improvement, Fictional Town	Document no.	RRD-SMP-XX-XX-RP-C-0002
Client	None – illustrative capability sample	Revision / status	P02 / S3
Originator	RoadRail Design (NRDMG Yapı Sistemleri A.Ş.)	Date	09/10/2026
Discipline	Highways – geometric design	Security	Public – sample
Prepared by	Senior Highway Engineer	Checked by	Principal Highway Engineer
Approved by	Associate Director – Highways	Classification	Report (RP)

Rev	Date	Status	Description	Prepared	Checked	Approved
P01	22/09/2026	S3	First issue to Overseeing Organisation for pre-submission review	Snr Hwy Eng	Prin. Hwy Eng	Assoc. Dir.
P02	09/10/2026	S3	Mitigation and risk assessment updated after pre-submission comments	Snr Hwy Eng	Prin. Hwy Eng	Assoc. Dir.

Illustrative sample. This document describes a fictional scheme prepared solely to demonstrate RoadRail Design's report structure, technical approach and standards knowledge. Locations, data, chainages, survey information, traffic figures and collision records are invented. It is not a client project and must not be relied upon for design. References are to the Design Manual for Roads and Bridges (DMRB) documents current at the date of issue; the applicable version of each standard would be confirmed with the Overseeing Organisation on a live project.

1. Departure summary

Departure reference	D-001 (Overseeing Organisation reference: to be allocated)
Scheme	A999 Example Junction Improvement, Fictional Town (fictional)
Road / location	A999 mainline eastbound and westbound, crest curve VC3, Ch 1+120-1+240 (vertex Ch 1+180)
Standard departed from	CD 109 Highway link design – Table 2.10 design speed related parameters (stopping sight distance; crest K value)
Design speed / speed limit	85A kph / 50 mph (proposed, subject to TRO)
Requirement	SSD desirable minimum 160 m (one step below 120 m); crest K desirable minimum 55 (one step below 30)
Proposed provision	Crest K = 24 (L = 120 m, A = 5.0%: +3.2% to –1.8%); SSD = 106 m in both directions
Departure type	Departure from standard – provision below the relaxation range permitted by CD 109
Design stage	Detailed design (pre-construction)
Related documents	RRD-SMP-XX-XX-RP-C-0001 Highway Design Report; DR-C-0005 Plan and profile; DR-C-0007 Visibility envelopes

2. Description of the departure

The proposed eastbound approach climbs at 3.2% from the sag VC2 to a crest at Ch 1+180 before descending at 1.8% to tie in with the existing A999 at Ch 1+350. The crest curve provides K = 24, giving a forward visibility envelope (eye height 1.05 m, object height 0.26 m) of 106 m in both directions. This is below the CD 109 one step below desirable minimum SSD of 120 m for 85 kph and therefore cannot be treated as a relaxation. The departure length is approximately 160 m including the approaches over which SSD is less than 120 m. The horizontal alignment through the crest is straight and no junctions, lay-bys or private accesses are located within the reduced-visibility length.

3. Reasons the standard cannot be met

The vertical profile is fixed at the crest by a (fictional) intermediate-pressure gas main crossing the A999 at Ch 1+195 with approximately 1.45 m cover to the existing road surface, and by the tie-in level at Ch 1+350. Lengthening the crest curve with unchanged grades lowers the road at the vertex by $e = A \cdot L / 800$:

Option	Crest K	Curve length L	Middle ordinate e	Lowering at vertex vs proposed	Consequence
Proposed	24	120 m	0.75 m	-	Main protected by concrete slab; no diversion
One step below desirable	30	150 m	0.94 m	0.19 m	Cover below gas operator's minimum; diversion required
Desirable minimum	55	275 m	1.72 m	0.97 m	Diversion of main and lowering of tie-in; extends works 250 m east

4. Alternatives considered

Option	Description	Indicative cost (illustrative)	Programme	Assessment
A	Full compliance (K = 55, SSD 160 m) with gas main diversion and extended tie-in	£1.60m additional	+12-18 months (utility lead-in)	Disproportionate cost; additional land take and vegetation loss
B	Relaxation-level compliance (K = 30, SSD 120 m) with gas main diversion	£0.45m additional	+9-12 months	Cost and programme disproportionate to safety benefit (14 m SSD)
C	Proposed: K = 24, SSD 106 m with mitigation (Section 6)	£0.04m (mitigation)	No change	Preferred - improves existing SSD (c. 90 m) by c. 18%
D	Do minimum: retain existing crest profile (SSD c. 90 m)	Nil	No change	Rejected - lower safety performance than Option C
E	Reduce speed limit to 40 mph through crest	Low	TRO dependent	Rejected - inconsistent with rural road environment; poor compliance expected

5. Safety assessment

CD 109 desirable minimum SSD is based on a 2 s perception-reaction time and a deceleration of 0.25g; the one step below value corresponds to approximately 0.375g. Applying 2 s and 0.375g to the 106 m provided, a driver can stop from about **78 kph**. The illustrative 85th percentile approach speed at the crest is **80 kph** (comparable 50 mph rural sites, eastbound uphill), and the 3.2% uphill grade on the eastbound approach assists braking. The residual shortfall is therefore small and is addressed by the mitigation below.

The illustrative 5-year collision record for the existing crest shows no personal injury collisions attributable to forward visibility. The scheme's principal collision problem (right-turn collisions at the B9999 junction, 620 m west) is addressed by the ghost island and is unaffected by this departure.

6. Proposed mitigation

- Double white line system (TSRGD diagram 1013.1) prohibiting overtaking over the crest, with warning line approaches.
- Raised retroreflective road studs on the centre line and edge lines through the departure length.
- High-friction-capable surface course: PSV and texture depth to the higher site category for an approach to a hazard (CD 236).
- No new accesses permitted within Ch 1+050-1+300; the existing field access at Ch 1+260 is relocated to Ch 1+320 with compliant visibility.
- Verge and hedge maintenance regime recorded in the Health and Safety File to keep the visibility envelope clear of vegetation.
- 50 mph speed limit (TRO) with repeater signing; speed and collision monitoring through Stage 4 RSA (12 and 36 months).

7. Risk assessment (GG 104 approach)

Likelihood (L) and severity (S) are scored 1 (very low) to 5 (very high); risk R = L × S. Residual risk is assessed after mitigation. Risk is to be as low as reasonably practicable.

No.	Hazard	Affected	L	S	R	Mitigation	L	S	Res. R
1	Driver fails to stop for stationary/slow vehicle beyond crest	Road users	3	4	12	Double white lines, studs, high-PSV surfacing, 50 mph limit	2	4	8
2	Head-on collision from overtaking over crest	Road users	3	5	15	Double white line system; continuous centre-line studs	1	5	5
3	Turning vehicle at field access hidden by crest	Road users, landowner	3	4	12	Access relocated to Ch 1+320 with full SSD	1	4	4

No.	Hazard	Affected	L	S	R	Mitigation	L	S	Res. R
4	Visibility envelope reduced by vegetation growth	Road users	3	3	9	Maintenance regime in H&S File and maintenance manual	2	3	6
5	Cyclist/pedestrian on carriageway beyond crest	NMUs	2	5	10	Shared-use path ends west of departure; route signed to quiet lane	1	5	5
6	Road worker exposure during maintenance at crest	Road workers	2	4	8	Advance signing per Chapter 8; works planned with lane closure	1	4	4

Overall residual risk is assessed as low to medium and lower than the do-minimum (existing) situation. The departure does not introduce a hazard to road workers or maintenance operations beyond those of a compliant alignment.

8. Maintenance and operational implications

Additional maintenance is limited to road stud replacement and twice-yearly verge vegetation cutting within the visibility envelope. No implications for winter service, inspection or structures. The gas main protection slab will be recorded in the as-built information and the Health and Safety File.

9. Designer's declaration

The design organisation confirms that the departure has been assessed against the alternatives above, that the safety risk has been assessed and reduced so far as reasonably practicable, and that no other relaxation or departure is combined with D-001 at this location.

Role	Signature	Date
Prepared: Senior Highway Engineer		09/10/2026
Checked: Principal Highway Engineer		09/10/2026
Approved: Associate Director – Highways (design team leader)		09/10/2026

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Decision: ☐ Approved ☐ Approved with conditions ☐ Rejected ☐ Further information required

Conditions / comments:

Name / role / date: – (left blank in sample)