

# I-4 at SR 434 Interchange — Corridor Design Brief

Content source file for the composer — liftable sections below

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## COVER FACTS

**Project title:** Interstate 4 (SR 400) at State Road 434 Interchange Reconstruction and Mainline Widening

**Corridor:** Interstate 4 (SR 400), from north of SR 436 (Semoran Boulevard) to south of SR 436 / Central Parkway — a 2.4-mile mainline segment centered on the SR 434 (Longwood / Altamonte Springs) interchange.

**Location:** Seminole County, Florida

**Agency:** Florida Department of Transportation, District Five (DeLand)

**Prepared by:** Kaldune (demonstration deliverable — see colophon)

**Locator line (for the corridor map strip):** I-4 · SR 400 · Seminole County · FDOT District Five · MP 91.6 to MP 94.0

**Financial Project ID (illustrative placeholder; mark as representative, NOT a real FPID):** Use the label "Financial Project ID: representative, demonstration piece" rather than a fabricated number string, so no real FDOT project record is implied.

**Design phase:** 30% Design (Phase II) following completion of the PD&E study.

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## PURPOSE & NEED

The Interstate 4 corridor through Seminole County carries regional through traffic between Orlando and the Interstate 4 / Interstate 95 system to the northeast, together with heavy commuter volumes serving Altamonte Springs, Longwood, and the SR 434 employment and retail corridor. Within the

project limits, I-4 currently operates with three general-use lanes in each direction. The SR 434 interchange is a conventional diamond configuration with signalized ramp terminals at the SR 434 crossroad.

The corridor within the project limits does not meet the Department's operational and safety objectives for the 2050 design year. Three conditions establish the need for improvement:

**Capacity and operations.** Existing (2024) average annual daily traffic on the I-4 mainline within the project limits is approximately 178,000 vehicles per day. Under the adopted regional travel demand model, design-year (2050) volumes are projected at approximately 241,000 vehicles per day, a 35 percent increase. The mainline segment operates at Level of Service (LOS) E during the weekday PM peak period under existing conditions and is projected to operate at LOS F throughout the extended peak in the design year with no improvement. The SR 434 ramp terminals experience recurring queuing that spills back onto the interstate mainline during peak periods.

**Safety.** The SR 434 interchange ramp terminals and the influence area of the interchange account for a disproportionate share of corridor crashes, with left-turn and rear-end crashes at the signalized ramp terminals the predominant crash types. The conventional diamond configuration presents left-turn movements across opposing through traffic at both ramp terminals.

**System continuity.** The three-lane mainline section within the project limits is a bottleneck between adjacent four-lane general-use sections to the north and south, concentrating congestion and merge/diverge conflict at the segment ends.

The purpose of the project is to increase mainline capacity, reduce recurring congestion and crash frequency at the SR 434 interchange, and restore continuity of the general-use lane section through Seminole County for the 2050 design year.

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## DESIGN INTENT

The proposed improvement widens I-4 within the project limits from three to four general-use lanes in each direction and reconstructs the SR 434 interchange from a conventional diamond to a diverging diamond interchange (DDI).

**Mainline.** Add one general-use lane in each direction, carried on the median (inside) side to maintain the existing outside edge and minimize outside right-of-way impact. The widened section

provides four 12-foot general-use lanes, full inside and outside shoulders, and a median configured to accommodate a future managed-lane or express-lane conversion without further mainline widening.

**Interchange.** Convert the SR 434 ramp terminals to a diverging diamond configuration. The DDI shifts the SR 434 crossroad traffic to the left side between the ramp terminals, eliminating the left-turn-across-opposing-traffic movement onto the interstate on-ramps and reducing the number of conflict points at the interchange. Ramp terminals are signalized at two phases rather than the multi-phase operation of the existing diamond, increasing crossroad and ramp throughput within substantially the same footprint.

**Multimodal.** The reconstructed SR 434 crossover accommodates a protected pedestrian and bicycle path routed through the median island, separated from vehicular movements, consistent with the Department's Complete Streets policy.

**Right-of-way.** The design is developed to hold the improvement within existing right-of-way to the extent practicable, with widening carried to the median side. Limited additional right-of-way is anticipated at the interchange quadrants for ramp regrading and stormwater management.

## TYPICAL SECTION SPEC (dimensioned — buildable cross-section)

**Section location:** I-4 mainline, proposed condition, looking north (station representative of mid-segment, away from the interchange).

**Total proposed right-of-way width:** 300 ft (existing ROW retained; widening to median side).

Cross-section, symmetric about the centerline of the median. From the outside (right ROW line) toward the centerline, one direction (mirror for the opposing direction):

| # | Element                                               | Dimension                         |
|---|-------------------------------------------------------|-----------------------------------|
| 1 | Right-of-way line to outside clear zone / front slope | (balance of ROW; see total below) |
| 2 | Outside (right) paved shoulder                        | 12 ft (full shoulder)             |

| # | Element                                                 | Dimension                                                    |
|---|---------------------------------------------------------|--------------------------------------------------------------|
| 3 | General-use Lane 4 (outside)                            | 12 ft                                                        |
| 4 | General-use Lane 3                                      | 12 ft                                                        |
| 5 | General-use Lane 2                                      | 12 ft                                                        |
| 6 | General-use Lane 1 (inside)                             | 12 ft                                                        |
| 7 | Inside (left) paved shoulder                            | 12 ft (full inside shoulder — future managed-lane provision) |
| 8 | Median — concrete barrier wall (single-slope), centered | 2 ft barrier + graded median                                 |
| — | <b>Median total (barrier + buffer both sides)</b>       | <b>26 ft</b>                                                 |

**Per-direction roadway width (shoulders + four lanes):**  $12 + (4 \times 12) + 12 = 72$  ft of paved travelway per direction.

**Both directions travelway:**  $72 + 72 = 144$  ft.

**Median (inside shoulders are counted in the 72 ft above; median barrier zone):** 26 ft centered.

**Composer dimension callouts to letter on the drawing:**

- Lane width: **12 ft** (each, all four general-use lanes)
- Outside shoulder: **12 ft**
- Inside shoulder: **12 ft**
- Median (single-slope concrete barrier, barrier + graded buffer): **26 ft**
- Design speed: **70 mph** (mainline)
- Cross slope: **2%** normal crown on travel lanes
- Right-of-way (ROW) line: mark both edges; **300 ft total ROW**
- Vertical clearance at SR 434 overpass structure: **16.5 ft** minimum

**Median note for the drawing legend:** Median configured with full inside shoulders to preserve a future express-lane / managed-lane conversion within existing right-of-way; single-slope concrete barrier separates directions.

**Existing typical section (for the before/after callout, if the composer wants a small inset):** three 12-ft general-use lanes per direction, 10-ft outside shoulder, 4-ft inside shoulder, depressed grass median with guardrail, design speed 70 mph.

THE NUMBERS (clean data table)

| Metric                                     | Existing                   | Proposed / Design Year (2050)               |
|--------------------------------------------|----------------------------|---------------------------------------------|
| General-use through lanes (each direction) | 3                          | 4                                           |
| Lane width                                 | 12 ft                      | 12 ft                                       |
| Outside shoulder                           | 10 ft                      | 12 ft                                       |
| Inside shoulder                            | 4 ft                       | 12 ft                                       |
| Median                                     | Depressed grass, guardrail | Single-slope concrete barrier, 26 ft        |
| Design speed (mainline)                    | 70 mph                     | 70 mph                                      |
| Mainline AADT                              | ≈ 178,000 (2024)           | ≈ 241,000 (2050 projected)                  |
| Mainline Level of Service (PM peak)        | LOS E                      | LOS D (with improvement) / LOS F (no build) |
| SR 434 interchange form                    | Conventional diamond       | Diverging diamond (DDI)                     |
| Right-of-way width                         | 300 ft                     | 300 ft (widening to median side)            |
| Total crash reduction (interchange)        | —                          | ≈ 33% (CMF 0.67, diamond → DDI)             |
| Injury crash reduction (interchange)       | —                          | ≈ 41% (CMF 0.59, diamond → DDI)             |
| Estimated construction cost                | —                          | \$185M – \$220M                             |

**Basis note for the crash-reduction figures (for the composer's small footnote):** Crash-reduction figures reflect published FHWA crash modification factors for conversion of a conventional diamond interchange to a diverging diamond interchange — CMF 0.67 for total crashes (approximately 33%

reduction) and CMF 0.59 for injury crashes (approximately 41% reduction), per the FHWA Diverging Diamond Interchange safety evaluation. Applied here illustratively to characterize the expected safety performance of the proposed interchange form.

**AADT / LOS basis note:** Traffic projections are representative of the corridor's regional travel demand context; the 2050 design-year volume reflects an illustrative 35% growth over existing conditions. Level of Service is reported on the HCM / FDOT LOS A–F scale for the PM peak period.

## SCHEDULE / PHASING

The project advances through the Department's standard project development phases. Durations and year ranges below are illustrative of the genre and the corridor's scale.

| Phase        | Activity                                                     | Timeframe   |
|--------------|--------------------------------------------------------------|-------------|
| PD&E         | Project Development & Environment study (complete)           | 2023 – 2025 |
| Design       | Final design (30% → 100% plans)                              | 2026 – 2028 |
| ROW          | Right-of-way acquisition (interchange quadrants, stormwater) | 2028 – 2030 |
| Construction | Interchange reconstruction & mainline widening               | 2030 – 2034 |

**Phasing note for the schedule bar:** Design and right-of-way phases overlap; construction is anticipated to be delivered in two segments — interchange reconstruction (SR 434 DDI) advanced first to relieve the primary bottleneck, followed by mainline widening through the segment. Maintenance of traffic maintains three general-use lanes per direction on the mainline throughout construction.

## COLOPHON — HONESTY LINE (required, must appear on the deliverable)

This is a demonstration piece produced by Kaldune to illustrate the studio's range in the transportation engineering deliverable genre. It is not a Florida Department of Transportation project

record and is not an FDOT submittal. All figures (traffic volumes, level-of-service ratings, crash-reduction estimates, right-of-way dimensions, cost ranges, and schedule) are illustrative and representative of the genre, not the verified data of any real project. Crash-reduction factors are drawn from published FHWA research applied illustratively. No real firm's identity or agency seal is represented.

## COMPOSER NOTES (not for the page — guidance)

- Corridor stays consistent throughout: **I-4 (SR 400) at SR 434, Seminole County, FDOT District Five**. Do not drift to a different interchange in any caption or hero.
- The rendered aerial hero should show a **diverging diamond interchange** on an urban/suburban interstate with a widened four-lane mainline — the crossover geometry is the recognizable signature of the DDI; get that right and a reviewer reads it instantly.
- Palette per plan Benchmarks: deep highway green, asphalt grey, signage white with sparing amber accent. Agency-neutral, not a brochure.
- The typical section is the technical centerpiece — author it as a clean dimensioned vector drawing (not a generated image), with the callouts listed above lettered on it.
- Keep the maker's mark (MADE BY KALDUNE) on the colophon per house law; the honesty line above sits with it.