Gasoline Flow Redesign — Documentation Package

Academic + technical documentation for **"Redesigning the Process of Gasoline Supply to Gas Stations"** (King Khalid University · MIS4114-3 Business Modeling · 2024–2025) and its presentation website https://fuel-flow-revamped.lovable.app.

Legend: **[ACAD]** academic process model · **[PROP]** proposed business solution · **[IMPL]** existing implementation · **[FUT]** future enhancement (not implemented).

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Folders: `diagrams/` · `screenshots/` · `source-code/` Combined formats: `documentation.html`, `Gasoline-Flow-Redesign-Documentation.pdf`.

01 — Project Overview

> **Evidence legend used throughout this package** - **[ACAD]** Academic process model (from the original BPR project material, as captured in the website content) - **[PROP]** Proposed business solution documented in the academic project (not software) - **[IMPL]** Existing implementation (verified in source code) - **[FUT]** Future Enhancement — NOT CURRENTLY IMPLEMENTED

1.1 Project title

Redesigning the Process of Gasoline Supply to Gas Stations — a Business Process Reengineering (BPR) project.

Item	Value (as documented)
Institution	King Khalid University
College / Department	College of Business · Department of Business Informatics
Course	MIS4114-3 Business Modeling
Semester	Spring · S2 · 462
Academic year	2024–2025
Activity-chart date	09-04-2025
Deliverable	Academic presentation website "Gasoline Flow Redesign" (https://fuel-flow-revamped.lovable.app)

1.2 Background [ACAD]

A company transports gasoline by truck from its headquarters to gas stations. Each trip involves route scheduling, truck preparation, fuel filling, identity/permission verification, road travel, unloading at the station, and return to headquarters.

1.3 Problem statement [ACAD]

Transporting gasoline to stations has become **expensive and difficult**, and **customers report that fuel does not arrive on time**. Problems concentrate in two stages: **P3 Travel to the station** and **P4 Unload fuel safely**.

1.4 Current situation [ACAD]

- Older/limited trucks exposed to breakdowns during transport.
- Road potholes, diversions, congestion and possible traffic violations delay trucks.
- Unloading requires clearing customers and managing fire risk; safety tools need renewal.
- Long waits and late deliveries.

1.5 Business need [ACAD]

Improve efficiency first, then develop the transportation process, to reduce delays, improve safety and support trucks when problems occur.

1.6 Vision statement [ACAD]

> "To become the best supplier of gasoline in the region, we must first improve efficiency and then develop the transportation process."

1.7 Project objectives [ACAD]

1. Identify the gasoline delivery process and locate its trouble stages.
2. Understand the process through documents, stakeholders, delivery times, inventory and demand.
3. Redesign the process using people, vehicle, support, scheduling and safety enablers.
4. Obtain management commitment for newer trucks, safety equipment and a backup truck.

1.8 Scope

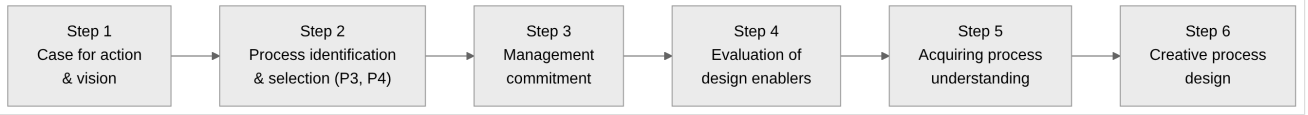
- **In scope [ACAD]:** truck-based gasoline delivery from headquarters to gas stations and return.
- **In scope [IMPL]:** a static, single-page academic presentation website of this analysis.
- **Out of scope:** any operational software (GPS, IoT, telemetry, APIs, payments, customer accounts, databases). See 18.

1.9 Expected improvements [ACAD]

Qualitative only (the source gives no measured results): fewer delays, safer unloading, faster response to breakdowns, less congestion and waiting, lower fuel consumption through newer, larger, fuel-efficient trucks. Source conclusion: *"If these solutions are activated, the company's position will be improved for the better."*

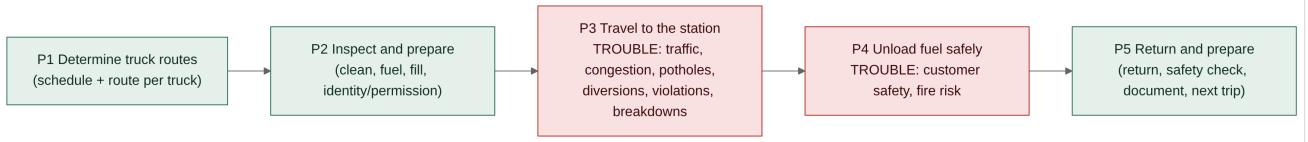
1.10 BPR approach [ACAD]

Six documented methodology steps (see 04 and 05): 1. Case for action & vision · 2. Process identification & selection · 3. Management commitment · 4. Evaluation of design enablers · 5. Acquiring process understanding · 6. Creative process design.



02 — Current Process [ACAD]

The academic project documents five connected operational stages (P1–P5). **P3 and P4 are explicitly marked as the processes in trouble.**



2.1 Stages, activities, actors, inputs, outputs

Stage	Activities	Actor(s)*	Inputs	Outputs
P1 Determine truck routes	Set a schedule and route for each truck	Headquarters / distributor	Station deliveries, available trucks	Schedule and route per truck
P2 Inspect and prepare	Make sure truck is clean; check fuel availability (wait if unavailable); fill the truck; verify identity/permission	Truck workers (drivers), headquarters	Truck, gasoline stock, permission	Clean, filled, authorized truck
P3 Travel to the station **(trouble)**	Drive to the station through traffic	Driver	Loaded truck, route	Truck arrives at station (often late)
P4 Unload fuel safely **(trouble)**	Inform the station, remove customers from the area, guidance signs, emergency procedures, fill station tanks, pack equipment	Driver, gas station operator	Loaded truck, station tanks	Fuel delivered to station
P5 Return and prepare	Return to HQ, check truck safety, document unloading, prepare for the next trip	Driver, headquarters	Empty truck	Documented trip, truck ready

*Actors are derived from the documented stakeholders and activity wording; the source does not provide a formal RACI.

2.2 Problems / bottlenecks

ID	Problem	Stage
B1	Delivery delay — fuel does not arrive on time	P3
B2	Road conditions — potholes and diversions	P3
B3	Congestion; city entry/exit times	P3
B4	Breakdowns during transportation	P3
B5	Unloading safety — customers must be cleared	P4
B6	Fire risk — newer fire-safety tools needed	P4

2.3 Waiting points

- P2: waiting for fuel to arrive when it is not available (flowchart decision).
- P3: congestion and traffic delays; long waits.
- P4: long waits at stations (addressed by proposed prediction devices).

2.4 Safety issues

Customer presence during unloading, fire risk, truck safety checks on return, and breakdown risk of older trucks.

2.5 Tracking / communication issues

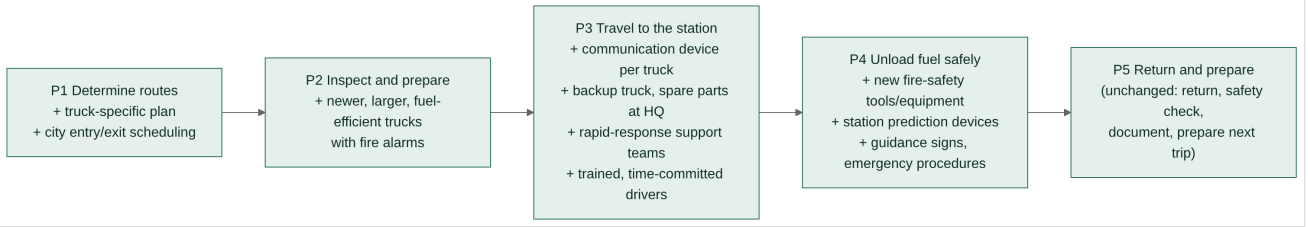
The source documents **difficulty communicating when problems occur on the road**. It does **not** describe vehicle tracking systems; no GPS/telemetry is part of the project.

2.6 Cost / efficiency issues

Transport has become expensive; older trucks consume more gasoline and break down; activity-chart times show long transport activities (Arrival time 30, Return trucks 30, Filling tanks 28).

03 — Proposed Process [PROP]

The redesign keeps the same five stages and adds documented enablers where problems occur. These are **business proposals**, not software features of the website.



3.1 Proposed stages

Stage	Proposed activities / changes	Actors	Inputs	Outputs
P1 Determine routes	Prepare plans for each truck so it reaches the right place with fewer problems; schedule city entry/exit times	HQ planners	Deliveries, city timing	Truck-specific plan and schedule
P2 Inspect and prepare	Use newer, larger, fuel-efficient trucks with fire alarms; sell older trucks	HQ, drivers	New trucks	Safer, efficient truck ready
P3 Travel	Communication device in each truck; backup truck; spare parts at HQ; rapid-response support teams; drivers trained in time commitment and quick problem-solving	Drivers, support teams	Loaded truck, plan	On-time arrival, fast recovery
P4 Unload	New fire-safety tools/equipment; station predictive devices to avoid congestion and long waits; guidance signs, emergency procedures, clear customers	Driver, station operator	Truck, station	Safe delivery
P5 Return and prepare	Unchanged from current process	Driver, HQ	Empty truck	Documented trip

3.2 Improvements by theme

- **Reduced waiting:** city entry/exit scheduling; station prediction devices.
- **Improved tracking / communication:** communication devices in trucks for roadside assistance (no GPS tracking is proposed).
- **Safety:** fire alarms, new fire-safety equipment, guidance signs, emergency procedures.
- **Operational:** newer larger fuel-efficient trucks, backup truck, spare parts, rapid support teams, driver development.

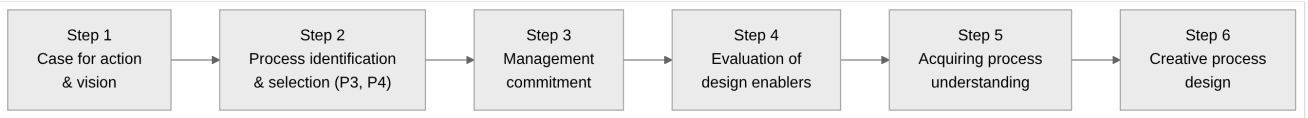
3.3 Management commitment requested

Approval for **newer trucks, new safety equipment and a backup truck**.

Item	Cost (as documented)
Trucks	100,000
Equipment	10,000
Other	5,000
Ad.	20,000

The source's total is ambiguous; it is deliberately **not recalculated**. Currency is not stated.

04 — Business Process Reengineering [ACAD]



4.1 Existing process

Five stages P1–P5 (see 02); trouble concentrated in P3 and P4.

4.2 Problems and documented root causes

Problem	Root cause (where documented)
Late deliveries	Congestion, road potholes/diversions, breakdowns
Breakdowns	Older / limited trucks; no backup truck or nearby spare parts
Slow recovery	Difficulty communicating on the road; no rapid support team
Unloading risk	Customers near unloading; outdated fire-safety tools
Long waits	Congestion at city entry/exit and at stations
Driver performance	Need for skill, time commitment and quick problem-solving

4.3 Proposed redesign

People (driver development), vehicles (newer, larger, fuel-efficient trucks with fire alarms), planning (truck-specific plans, city scheduling), support (communication devices, backup truck, spare parts, rapid teams), safety (new tools, procedures) and station prediction devices.

4.4 Expected impact

Qualitative only: improved efficiency, safety and punctuality; "the company's position will be improved for the better." **No quantitative results exist in the source and none are claimed here.**

4.5 Process transformation

Current	Proposed
Older trucks and repeated transport disruption	Newer trucks, sell older ones; larger, more fuel-efficient trucks
Breakdowns during road stage	Backup truck, spare parts at HQ, rapid support teams
Congestion, traffic delays, long waits	City entry/exit scheduling; station prediction devices
Difficulty communicating when problems occur	Modern communication devices in trucks
Safety risk while unloading	Fire alarms, new safety equipment, guidance signs, emergency procedures, clear customers
Driver performance and time commitment	Develop driving, time commitment, rapid problem-solving

05 — Process Stages

Two levels of "stage" exist in the project and are kept distinct: - **Part A — BPR methodology steps 1–6** (the documented project steps). - **Part B — Operational stages P1–P5** of the gasoline delivery process.

Part A — BPR steps 1–6 [ACAD]

#	Step	Purpose	Activities	Responsible	Inputs	Outputs	Problems addressed	Proposed improvement	Diagram
1	Case for action & vision	Justify change	State cost/difficulty and late arrivals; write vision	Project team	Complaints, cost pressure	Case + vision statement	Expensive, late deliveries	Improve efficiency then transport	bpr-model
2	Process identification & selection	Pick the process and trouble points	Map P1–P5; mark P3, P4	Project team	Delivery process	Selected process, P3/P4 flagged	Road and unloading issues	Focus redesign on P3/P4	current-process
3	Management commitment	Secure approval and budget	Request trucks, equipment, backup truck; cost table	Management	Proposals, costs	Approval request	Resource limits	Newer trucks, safety equipment, backup truck	—
4	Evaluation of design enablers	Select enablers	Modern trucks with fire alarms, communication, city scheduling software, station prediction devices, safety tools	Project team	Problems list	Enabler set	B1–B6	Enablers list	proposed-process
5	Acquiring process understanding	Learn the process	Collect contracts, supply agreements, delivery schedules; interviews; surveys; study delivery times, inventory, demand forecasting	Project team, stakeholders	Documents, interviews	Stakeholder/segment view	Knowledge gaps	—	—
6	Creative process design	Design new process	Driver development, modern trucks, truck plans, communication device, support teams	Project team	Enablers, understanding	Redesigned process	All	See 03	proposed-process, flowchart

> Note: Steps 7–8 of a generic BPR method are **not** part of the submitted project and are not documented.

Part B — Operational stages P1–P5

P1 Determine truck routes

- **Purpose:** plan each trip. **Activities:** set schedule and route per truck. **Actor:** HQ. **Inputs:** deliveries, trucks. **Outputs:** schedule. **Problems:** none flagged. **Proposed:** truck-specific plans; city entry/exit scheduling. **Diagram:** flowchart step 01.

P2 Inspect and prepare

- **Purpose:** ready the truck. **Activities:** cleanliness check, fuel availability check (wait if none), filling, identity/permission. **Actor:** drivers, HQ. **Inputs:** truck, fuel. **Outputs:** filled, authorized truck. **Problems:** waiting for fuel; older trucks. **Proposed:** newer trucks with fire alarms. **Diagram:** flowchart steps 02–04.

P3 Travel to the station — TROUBLE

- **Purpose:** transport fuel. **Actor:** driver. **Problems:** B1–B4. **Proposed:** communication devices, backup truck, spare parts, rapid teams, driver development, scheduling. **Diagram:** flowchart step 05.

P4 Unload fuel safely — TROUBLE

- **Purpose:** deliver fuel safely. **Activities:** inform station, clear customers, guidance signs, emergency procedures, fill tanks, pack equipment. **Actor:** driver, station operator. **Problems:** B5–B6, long waits. **Proposed:** fire-safety tools, station prediction devices. **Diagram:** flowchart steps 06–07.

P5 Return and prepare

- **Purpose:** close the trip. **Activities:** return, safety check, document unloading, prepare next trip. **Actor:** driver, HQ. **Problems:** none flagged. **Proposed:** unchanged. **Diagram:** flowchart steps 08–09.

06 — Business Analysis and Requirements

6.1 Business analysis [ACAD]

- **Business problem:** expensive, difficult gasoline transport and late deliveries.
- **Stakeholders:** suppliers, distributors, gas station operators, regulatory bodies; customer segments: individual consumers, businesses, fleet operators.
- **Business objectives:** efficiency first, then better transportation; become the region's best gasoline supplier.
- **Process requirements:** each truck must be scheduled, clean, filled, authorized, delivered safely, returned and documented.
- **Operational requirements:** safe unloading (customers cleared, signs, emergency procedures); support during breakdowns.
- **Constraints:** management budget approval; ambiguous cost total; road/city conditions outside company control.
- **Expected benefits:** qualitative (punctuality, safety, efficiency).

6.2 Business requirements [PROP]

ID	Requirement
BR-1	Replace older trucks with newer, larger, fuel-efficient trucks fitted with fire alarms
BR-2	Provide new fire-safety equipment for unloading
BR-3	Maintain a backup truck and spare parts at headquarters
BR-4	Equip each truck with a communication device for roadside assistance
BR-5	Schedule truck entry and exit times in cities
BR-6	Use predictive devices at stations to avoid congestion and waiting
BR-7	Develop drivers' skill, time commitment and problem-solving
BR-8	Prepare a plan for each truck; prepare rapid-response support teams

These are **not** implemented in software; the website only presents them.

6.3 Functional requirements of the website [IMPL]

ID	Requirement	Verified in
FR-1	Present all project sections on one page (`/`)	`src/routes/index.tsx`
FR-2	Section navigation: desktop sidebar, mobile toggle menu	`navItems`, `menuOpen`
FR-3	Select a current-process stage (P1–P5) to show its note	`selectedStage`
FR-4	Select a flowchart step (01–09) to show details and progress	`ProcessFlow`
FR-5	Toggle comparison: side by side / current only / proposed only	`comparisonMode`
FR-6	Display the activity chart table with symbol legend	`activityRows`
FR-7	Display documented cost table without recalculating	commitment section

6.4 Non-functional requirements [IMPL]

ID	Requirement
NFR-1	Responsive (verified at 1280 px and 390 px widths)
NFR-2	Accessible native buttons/links, `aria-label`, `aria-pressed`, focus rings
NFR-3	Reduced-motion support in `styles.css`
NFR-4	Static content; no data collection, accounts or external APIs
NFR-5	SEO metadata (title, description, Open Graph, Twitter card)
NFR-6	Source fidelity: no invented facts, values or classifications
NFR-7	Semantic design tokens (petrol green, amber, red)

07 — Actors and Stakeholders [ACAD]

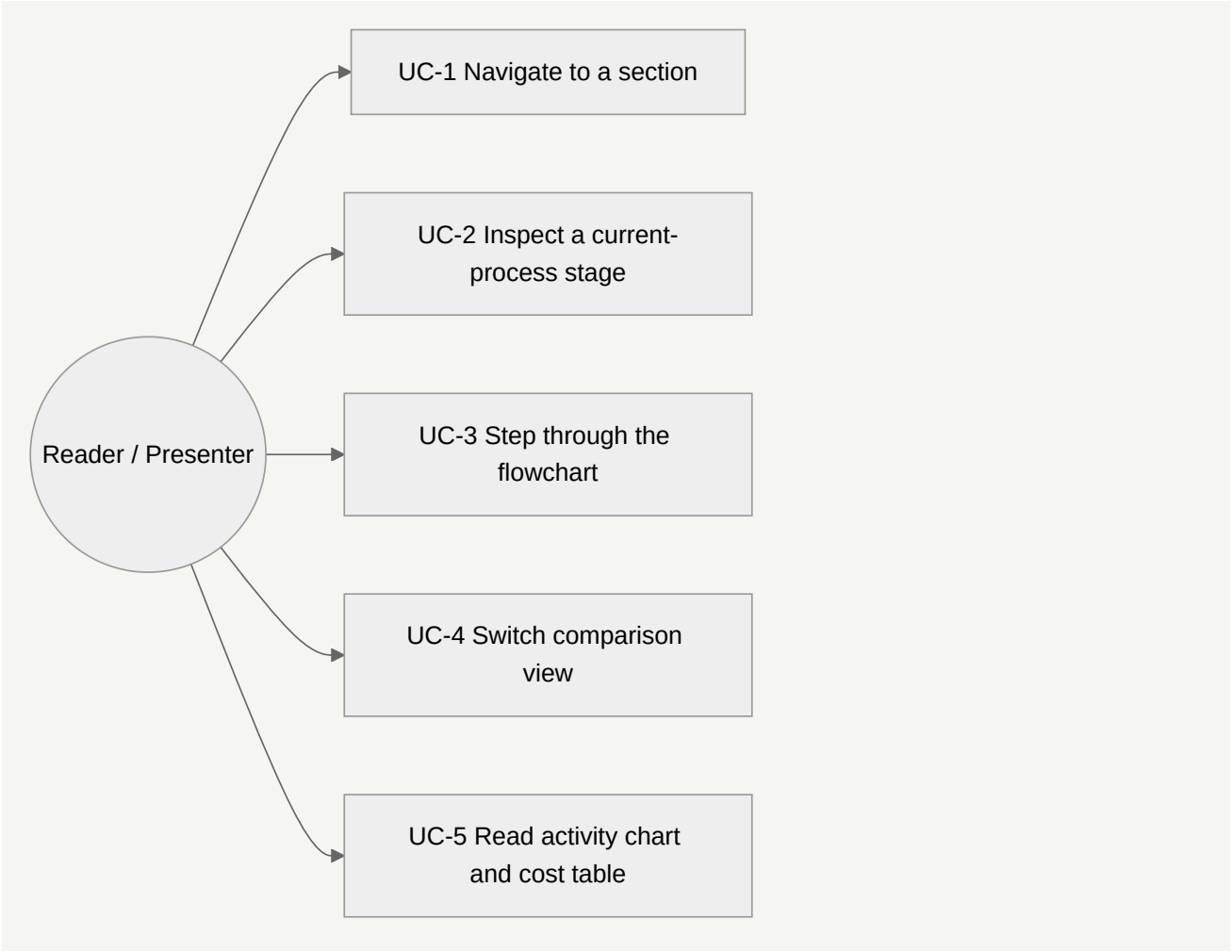
Stakeholders and customer segments are documented in the project. Responsibilities/inputs/outputs are derived from the documented process; where the source is silent this is marked *(derived)*.

Actor	Type	Role	Responsibilities	Interaction with process	Inputs	Outputs
Suppliers	Stakeholder	Provide gasoline	Fuel availability *(derived)*	P2 fuel check / filling	Orders, agreements	Gasoline stock
Distributors (the company / HQ)	Stakeholder	Operate delivery	Schedule routes, prepare trucks, document trips	P1, P2, P5	Deliveries, trucks	Schedules, documented trips
Truck workers / drivers	Actor	Transport and unload	Travel, unload safely, return; time commitment	P2–P5	Loaded truck, plan	Delivered fuel
Gas station operators	Stakeholder	Receive fuel	Be informed, clear area *(derived)*	P4	Delivery	Filled station tanks
Regulatory bodies	Stakeholder	Regulate	Identity/permission, safety rules *(derived)*	P2, P4	—	Permissions
Management	Actor	Approve	Approve trucks, equipment, backup truck	BPR step 3	Proposal, costs	Commitment
Support teams *(proposed)*	Actor	Rapid response	Arrive quickly on problems	P3	Communication call	Recovered trip
Individual consumers	Customer segment	Buy fuel	—	Affected by delays/safety in P4	—	—
Businesses	Customer segment	Buy fuel	—	Affected by delays	—	—
Fleet operators	Customer segment	Buy fuel	—	Affected by delays	—	—

Website users [IMPL]: a single anonymous role — the reader/presenter. No accounts or roles exist.

08 — Use Case Model

Statement: The project is primarily a **process redesign presentation**. The real-world gasoline process has no software system, so no business-system use cases are modelled. Only the presentation website's own reader interactions are modelled below.

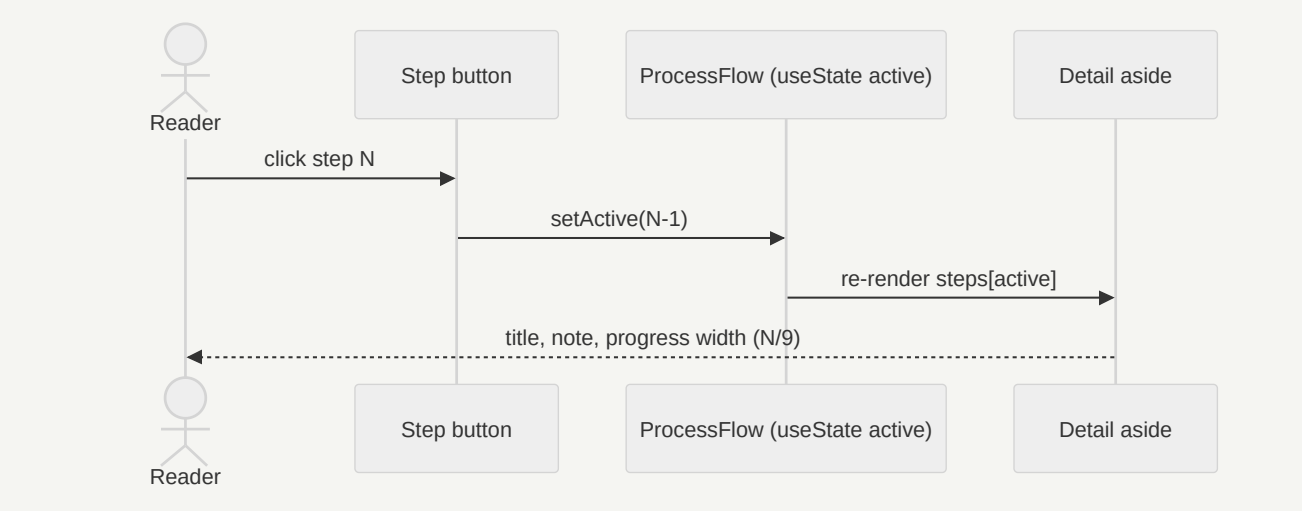


ID	Name	Actor	Precondition	Main flow	Postcondition
UC-1	Navigate to a section	Reader	Page loaded	Click sidebar link (desktop) or open menu and click (mobile)	Page scrolls to `#section`; mobile menu closes
UC-2	Inspect stage	Reader	Current section visible	Click P1–P5 card	Card highlighted; note panel shows stage note
UC-3	Step through flowchart	Reader	Flowchart visible	Click step 01–09	Detail panel + progress bar update
UC-4	Switch comparison	Reader	Comparison visible	Click Side by side / Current only / Proposed only	Columns shown accordingly; button `aria-pressed=true`
UC-5	Read tables	Reader	—	Scroll (horizontal on narrow screens)	—

09 — UML and Object Model

Diagram	Status
Use Case Diagram	Provided for the website only (08)
Activity Diagram	Provided — the process flowchart (17)
Sequence Diagram	Provided for one UI interaction (below)
Class Diagram	**Not applicable to the current implementation.** No classes exist; the code uses React function components and constant arrays.
State Diagram	Provided for comparison-mode UI state (below)
Component Diagram	Provided (14)

Sequence — selecting a flowchart step [IMPL]



State — comparison mode [IMPL]

Objects / components actually present [IMPL]

No object-oriented domain model exists. Real code units:

Unit	Kind	Responsibility	Attributes / props	Behaviour
`Index`	React component	Renders full page	state: `menuOpen`, `selectedStage`, `comparisonMode`	setters on click

Unit	Kind	Responsibility	Attributes / props	Behaviour
`SectionHeading`	React component	Section header	`number, eyebrow, title, description?`	pure render
`ProcessFlow`	React component	Interactive flowchart	local `steps` array; state `active`	`setActive(index)`
`Button`	forwardRef component	Styled button	`ButtonProps` + `active`	sets `aria-pressed`, variant
`cn`	function	Merge class names	`...inputs`	`twMerge(clsx())`
`navItems, currentStages, problems, enablers, activityRows, comparisons`	const arrays	Static content	tuples / objects	none

Relationships: `Index` uses `SectionHeading`, `ProcessFlow`, `Button`, `cn` and the arrays; `Button` uses `buttonVariants` and `cn`.

10 — Database and Data Model

No implemented database identified.

Verification: no backend/Cloud connection, no `supabase` integration folder, no server functions, no `src/routes/api/`, no `fetch` calls in `src/routes/index.tsx`. No ERD is produced.

In-code static data structures [IMPL]

Constant	Shape	Count
`navItems`	`[id, label]`	12
`currentStages`	`{ code, title, note, trouble? }`	5
`problems`	`[title, text]`	6
`enablers`	`[Icon, title, text]`	5
`activityRows`	`[no, description, time]`	9
`comparisons`	`[current, proposed]`	6
`ProcessFlow.steps`	`[no, title, note]`	9

UI state is transient React `useState` and is lost on reload; nothing is stored.

11 — Source Code Documentation [IMPL]

Stack: **TanStack Start v1** (React 19, SSR) · Vite 7 · TypeScript · Tailwind CSS v4 · shadcn/ui primitives · lucide-react icons. Full copies of key files are in `source-code/`.

11.1 Routes

Path	File	Purpose
(root shell)	`src/routes/__root.tsx`	HTML document, global meta, fonts, favicon, 404 and error components
`/`	`src/routes/index.tsx`	The entire academic presentation
any other	`NotFoundComponent` in `__root.tsx`	"Page not found" with link home

11.2 Route definition and metadata

`src/routes/index.tsx` — `Route`

```
export const Route = createFileRoute("/")({
  head: () => ({
    meta: [
      { title: "Gasoline Supply Process Redesign | Academic BPR Project" },
      { name: "description", content: "An interactive academic presentation of the Business Process Reengineering
project for gasoline supply to gas stations." },
      { property: "og:title", content: "Redesigning the Process of Gasoline Supply to Gas Stations" },
      { property: "og:description", content: "A source-grounded Business Process Reengineering project from King
Khalid University." },
    ],
  }),
  component: Index,
});
```

Registers the `/` route, its SEO tags and the `Index` component. `og:type` and `twitter:card` are set in `__root.tsx`.

11.3 Static content (data-driven design)

`src/routes/index.tsx` — `currentStages`

```
const currentStages = [
  { code: "P1", title: "Determine truck routes", note: "Set a schedule and route for each truck." },
  ...
  { code: "P3", title: "Travel to the station", note: "The truck travels through traffic, congestion, potholes,
diversions, and possible violations.", trouble: true },
  { code: "P4", title: "Unload fuel safely", note: "Inform the station, remove customers from the area, use
guidance signs, and follow emergency procedures.", trouble: true },
  ...
];
```

`trouble: true` drives the red "danger-soft" styling and warning icon. Other arrays: `navItems`, `problems`, `enablers`, `activityRows`, `comparisons` (see 10).

11.4 `SectionHeading` component

```
function SectionHeading({ number, eyebrow, title, description }: { number: string; eyebrow: string; title: string;
description?: string }) {
```

```
  return (
    <div className="mb-9 grid gap-4 border-t border-border pt-5 md:grid-cols-[9rem_1fr]">
      <p className="text-xs font-bold uppercase text-primary">{number} / {eyebrow}</p>
      <div>
        <h2 className="max-w-3xl text-3xl font-semibold leading-tight md:text-5xl">{title}</h2>
        {description ? <p className="mt-4 max-w-2xl text-base leading-7 text-muted-foreground">{description}</p> :
null}
      </div>
    </div>
  );
}
```

Reusable, stateless header used by all numbered sections (01–11).

11.5 State management — `Index`

```
const [menuOpen, setMenuOpen] = useState(false);
const [selectedStage, setSelectedStage] = useState(0);
const [comparisonMode, setComparisonMode] = useState<"both" | "current" | "proposed">("both");
const selectedStageData = currentStages[selectedStage] ?? { code: "P1", title: "Determine truck routes", note: "Set
a schedule and route for each truck." };
```

Local React state only; no global store, no persistence. The `??` fallback satisfies strict TypeScript indexing.

11.6 Comparison toggle logic

```
{([ ["both", "Side by side"], ["current", "Current only"], ["proposed", "Proposed only"] ] as const).map(([value,
label]) =>
  <Button key={value} active={comparisonMode === value} onClick={() => setComparisonMode(value)}>{label}</Button>)}
...
{comparisonMode !== "proposed" ? <div ...>{current}</div> : null}
{comparisonMode !== "current" ? <div ...>{proposed}</div> : null}
```

Columns are conditionally rendered; grid switches between 1 and 2 columns.

11.7 `ProcessFlow` component

```
function ProcessFlow() {
  const steps = [
    ["01", "Determine routes", "Set the schedule and route for each truck."],
    ["02", "Pre-trip inspection", "Make sure the truck is clean and ready."],
    ["03", "Check fuel", "If fuel is unavailable, wait for it to arrive."],
    ...
    ["09", "Document and prepare", "Check safety, document unloading, and prepare the next trip."],
  ] as const;
  const [active, setActive] = useState(0);
  ...
  <div className="h-full bg-primary transition-all" style={{ width: `${((active + 1) / steps.length) * 100}%` }} />
}
```

Nine selectable steps; the dark aside shows the selected step and a progress bar of `(active+1)/9`.

11.8 `Button` — `src/components/ui/button.tsx`

```
const Button = React.forwardRef<HTMLButtonElement, ButtonProps>(
  ({ active = false, className, variant, size, type = "button", ...props }, ref) => (
    <button ref={ref} type={type} aria-pressed={active}
      className={cn(buttonVariants({ variant: active ? "default" : variant ?? "outline", size }), className)}
{...props} />
```

```
  ),
);
```

`cva` variants (default, destructive, outline, secondary, ghost, link; sizes default/sm/lg/icon). The custom `active` prop sets `aria-pressed` and the filled variant.

11.9 Utility — `src/lib/utils.ts`

```
export function cn(...inputs: ClassValue[]) { return twMerge(clsx(inputs)); }
```

11.10 Router — `src/router.tsx`

Creates the TanStack router with a `QueryClient` context and `scrollRestoration: true`. React Query is present from the template but **not used** for any data.

11.11 Styling — `src/styles.css`

Tailwind v4 with `@theme inline` tokens. Key light-theme tokens: | Token | Value | Use | |---|---|---| | `--background` | `oklch(0.975 0.008 85)` | warm white page | | `--foreground` | `oklch(0.235 0.035 250)` | ink/navy text | | `--primary` | `oklch(0.43 0.09 166)` | petrol green (process) | | `--warning` | `oklch(0.58 0.13 72)` | amber (cautions) | | `--destructive` | `oklch(0.53 0.18 28)` | red (bottlenecks) | Fonts: DM Sans (sans), Source Serif 4 (quotes). `@media (prefers-reduced-motion: reduce)` disables animation.

11.12 Configuration

`vite.config.ts` (Lovable TanStack config), `tsconfig.json` (strict, `@/` alias), `components.json` (shadcn), `eslint.config.js`, `.prettierrc`. `src/server.ts` and `src/start.ts` are template SSR/start entries; `src/lib/error-*.ts` and `lovable-error-reporting.ts` handle error display/reporting.

11.13 Source-code appendix

See `source-code/`: `src_routes_index.tsx`, `src_routes___root.tsx`, `src_components_ui_button.tsx`, `src_styles.css`, `src_lib_utils.ts`, `src_router.tsx`, `package.json`, `vite.config.ts`, plus the documentation scripts `run_tests.py`, `run_screenshots.py`, `render_diagrams.py`.

12 — Project Structure [IMPL]

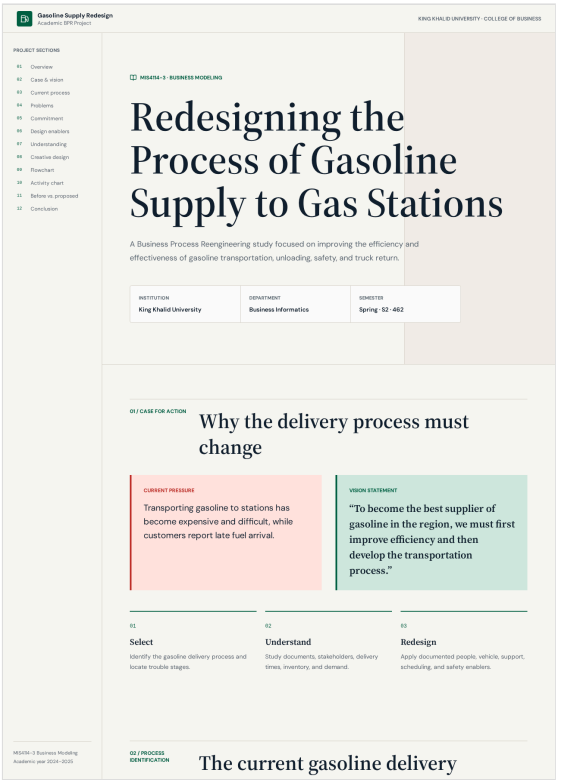
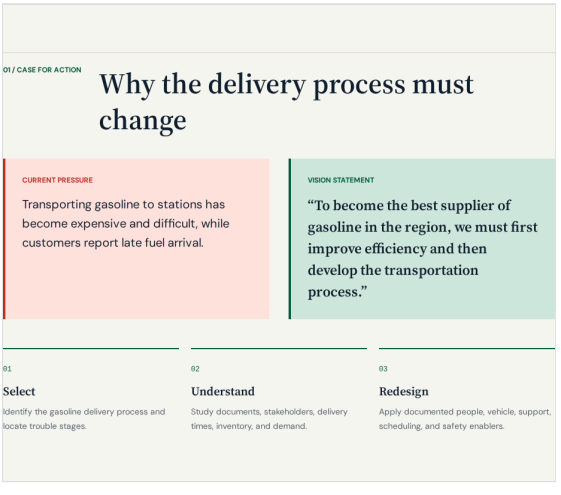
```
.
├── AGENTS.md                 architecture rule (static single route)
├── README.md
├── components.json           shadcn/ui config
├── eslint.config.js
├── package.json              scripts: dev, build, preview, lint, format
├── tsconfig.json
├── vite.config.ts
├── public/
│   ├── favicon.png           custom fuel-nozzle favicon
│   └── robots.txt
├── src/
│   ├── assets/favicon-src.png   source image of the favicon
│   ├── components/ui/           shadcn primitives (only button.tsx is used)
│   ├── hooks/use-mobile.tsx     template hook (unused)
│   ├── lib/
│   │   ├── utils.ts             cn() helper
│   │   ├── error-capture.ts     template error handling
│   │   ├── error-page.ts
│   │   └── lovable-error-reporting.ts
│   ├── routes/
│   │   ├── __root.tsx           document shell, meta, fonts, favicon, 404/error
│   │   └── index.tsx            the presentation ( / )
│   ├── routeTree.gen.ts         generated route tree (do not edit)
│   ├── router.tsx               router factory
│   ├── server.ts / start.ts     SSR entry / start config
│   └── styles.css               design tokens + Tailwind
└── docs/                        this documentation package
    ├── 01…19 *.md, README.md, DOCUMENTATION-AUDIT.md
    ├── diagrams/   (.mmd source, .svg, .png)
    ├── screenshots/
    ├── source-code/
    └── documentation.html / Gasoline-Flow-Redesign-Documentation.pdf
```

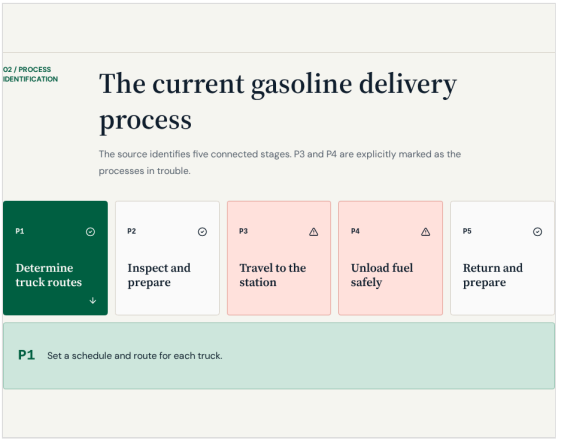
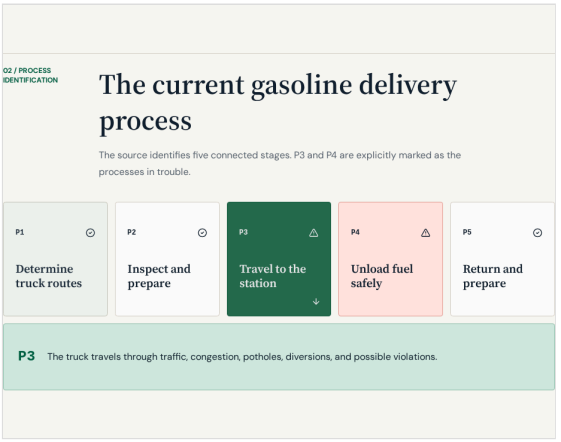
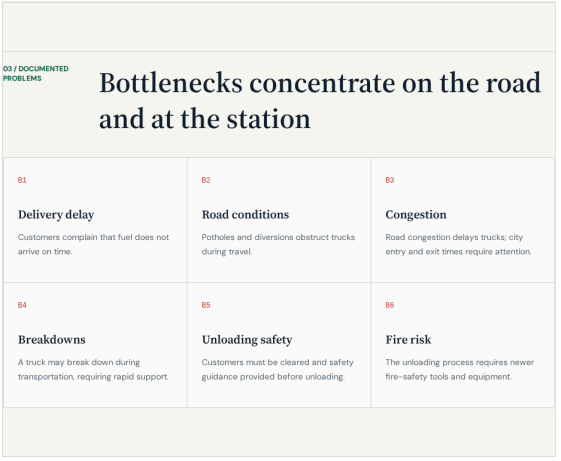
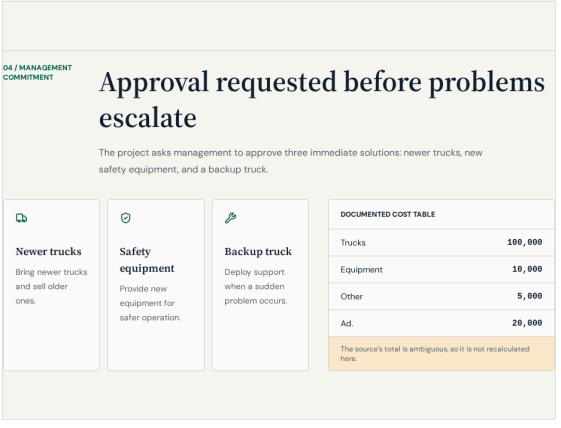
Important: all presentation content and logic live in **`src/routes/index.tsx`**. Of the shadcn primitives in `components/ui/`, only `button.tsx` is imported by the page; the others are unused template files.

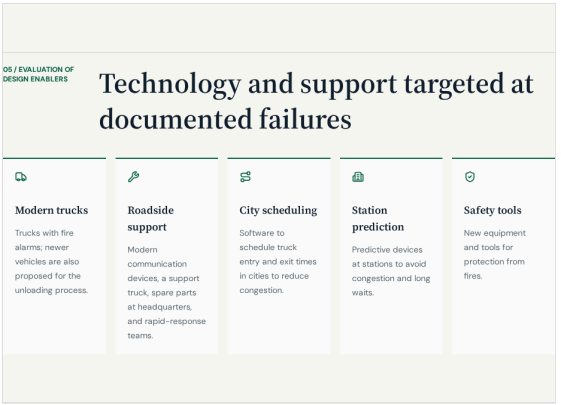
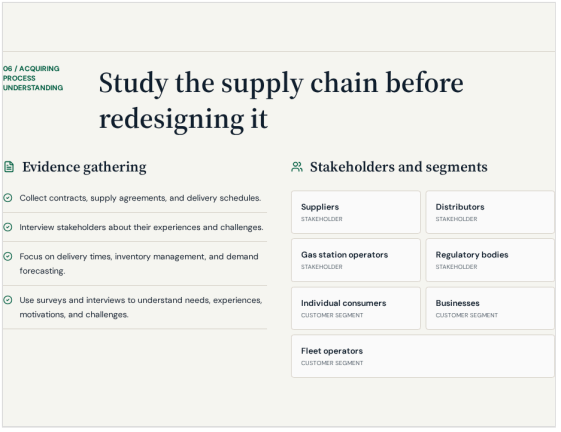
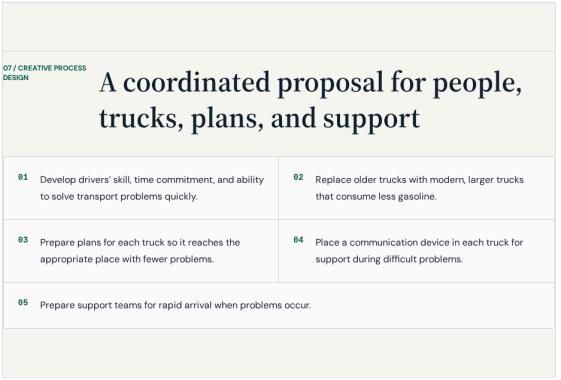
13 — UI Documentation [IMPL]

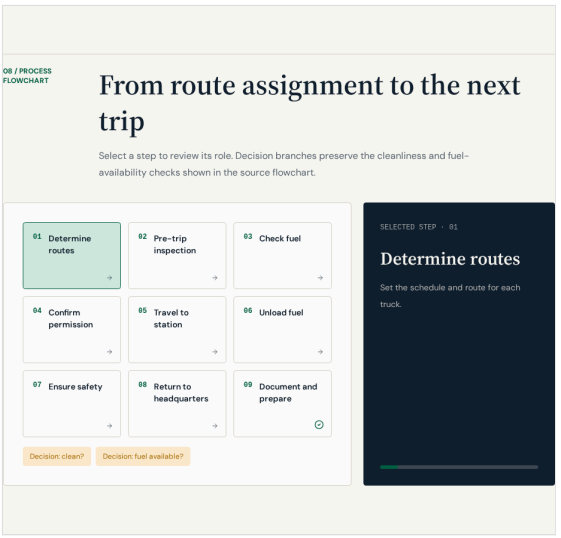
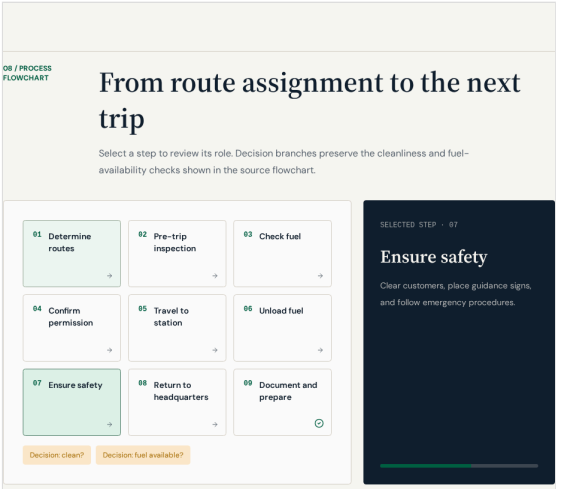
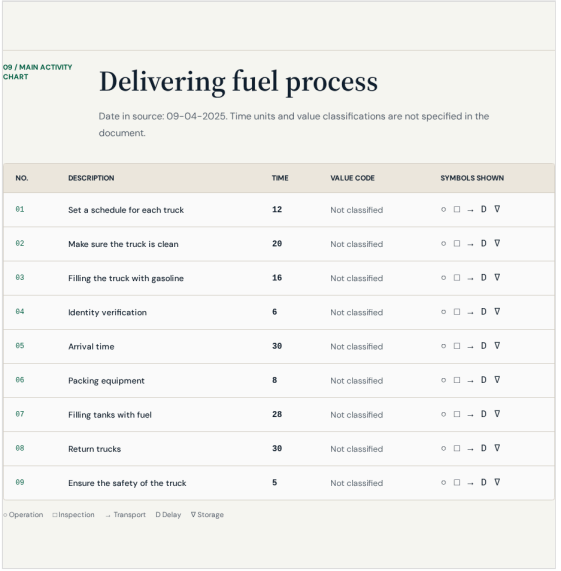
The application has **one page** (`/`) divided into 12 anchored sections, plus a 404 page. Common elements: sticky header (logo → `#overview`, institution text, mobile menu toggle), desktop sidebar with numbered links 01–12, footer.

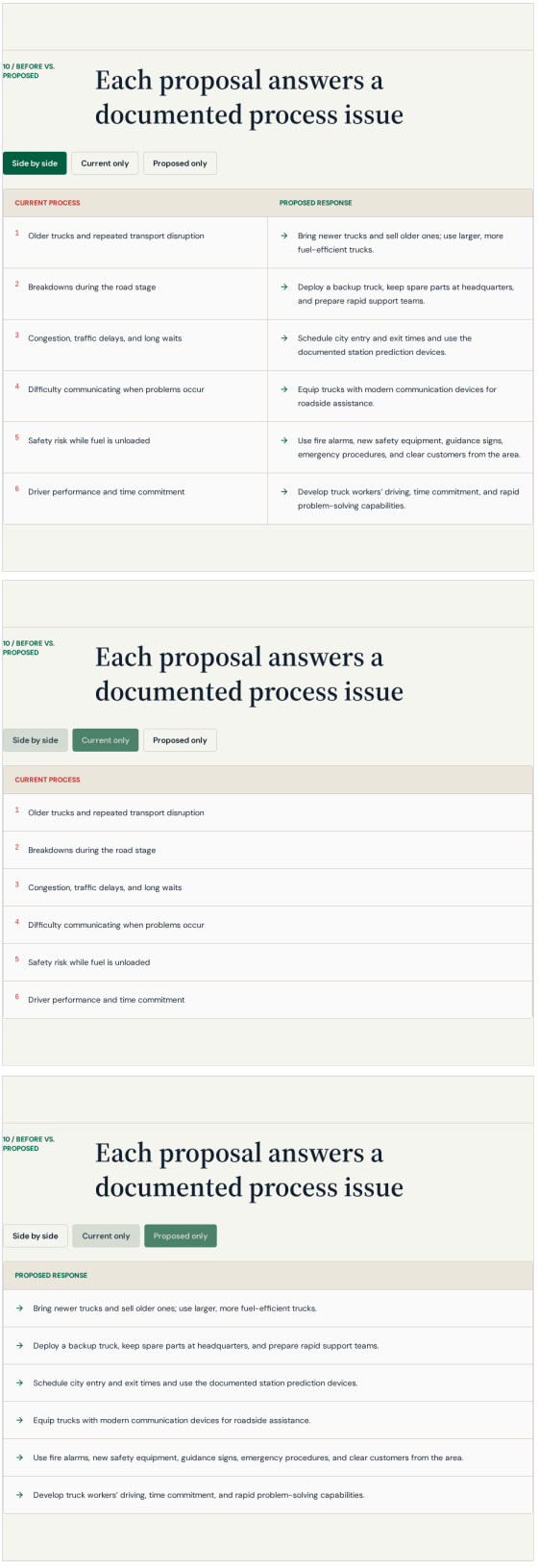
Inputs are clicks/taps only (no forms, no text entry). **Outputs** are on-screen content changes.

#	Section (anchor)	Purpose	Components	Interaction	Screenshot
—	Header + sidebar	Navigation	links, `Button` (menu)	click link → scroll; toggle mobile menu	18, 19
1	Overview `#overview`	Title, course, institution	info grid	—	
2	Case & vision `#case`	Case for action, vision, 3 phases	cards, quote	—	

#	Section (anchor)	Purpose	Components	Interaction	Screenshot
3	Current process `#current`	P1–P5, trouble stages	stage buttons, note panel	click stage → note	 
4	Problems `#problems`	B1–B6	grid	—	
5	Commitment `#commitment`	Approval + cost table	cards, table	—	

#	Section (anchor)	Purpose	Components	Interaction	Screenshot
6	Design enablers `#enablers`	5 enablers	cards	—	
7	Understanding `#understanding`	Evidence + stakeholders	lists	—	
8	Creative design `#design`	5 proposals	grid	—	

#	Section (anchor)	Purpose	Components	Interaction	Screenshot
9	Flowchart `#flowchart`	9 steps	`ProcessFlow`	click step → detail + progress	 
10	Activity chart `#activity`	9 activities, times, legend	table (h-scroll on mobile)	—	

#	Section (anchor)	Purpose	Components	Interaction	Screenshot
11	Before vs. proposed `#comparison`	6 pairs	`Button` ×3, grid	toggle view	

#	Section (anchor)	Purpose	Components	Interaction	Screenshot
12	Conclusion `#conclusion`	Closing quote	banner	—	
—	404	Unknown URL	"Go home" link	click → /	—

Responsive behaviour: at `< lg` (1024 px) the sidebar is hidden and a 2-column menu opens from the header; tapping a link closes it. Verified at 390 px with no horizontal overflow.

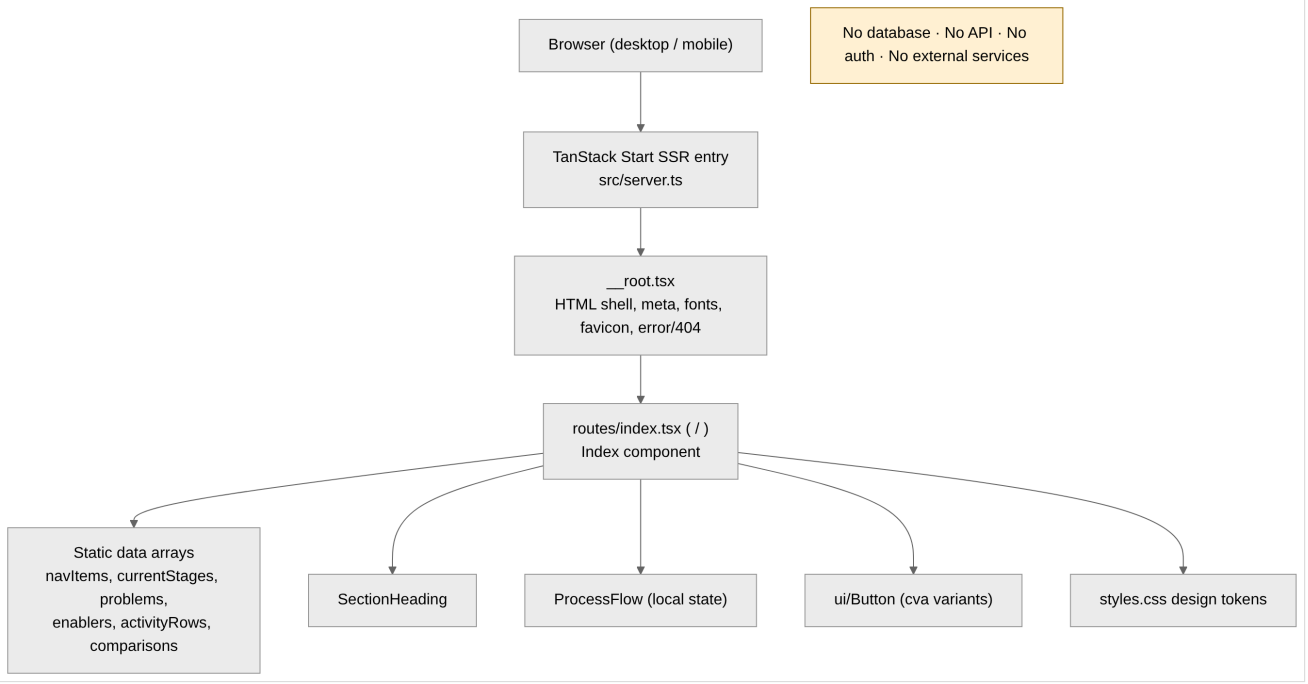
14 — System Architecture

Two things must not be confused:

14.1 Real-world gasoline supply process [ACAD / PROP]

A physical business process (HQ → truck → road → station → HQ). It has **no software system** in the project. Proposed "city scheduling software" and "station predictive devices" are business enablers named in the academic project; they are **not** designed or built.

14.2 Presentation/Documentation Application Architecture [IMPL]



Layer	Implementation
Frontend	React 19 components rendered by TanStack Start (SSR + hydration)
Components	`Index`, `SectionHeading`, `ProcessFlow`, `ui/Button`
Data layer	Constant arrays inside `index.tsx` (no fetching)
Services	None (no server functions, no API routes)
External systems	Google Fonts stylesheet only; hosting on Lovable (`fuel-flow-revamped.lovable.app`)
Database / auth	None

15 — Testing [IMPL]

Automated end-to-end checks were executed with Playwright (Chromium, headless) against the running site at desktop 1280×1800 and mobile 390×844. Script: `source-code/run_tests.py`. **Result: 23 / 23 PASS.**

Forms: **none exist** — not applicable.

ID	Area	Test	Expected	Result
TC-01	Page	Load `/`	HTTP 200	PASS
TC-02	Metadata	Page title	"Gasoline Supply Process Redesign | Academic BPR Project"	PASS
TC-03	Pages	All 12 section anchors exist	12 found	PASS
TC-04	Navigation	Desktop sidebar links	12 links	PASS
TC-05	Links	Click "Activity chart"	URL ends `#activity`	PASS
TC-06	Interactive	Click stage P4	Note "Inform the station…"	PASS
TC-07	Interactive	Click flowchart step 09	Panel "SELECTED STEP · 09 / Document and prepare"	PASS
TC-08	Interactive	Progress at step 09	width 100%	PASS
TC-09	Buttons	"Current only"	only current column	PASS
TC-10	Accessibility	Active toggle	`aria-pressed="true"`	PASS
TC-11	Buttons	"Proposed only"	only proposed column	PASS
TC-12	Buttons	"Side by side"	both columns	PASS
TC-13	Content	Activity times	12,20,16,6,30,8,28,30,5	PASS
TC-14	Content	Cost table values + "not recalculated" note	present	PASS
TC-15	Favicon	`<link rel=icon>`	`/favicon.png`	PASS
TC-16	Favicon	`/favicon.ico` (old default)	not served (404)	PASS
TC-17	Scope	No GPS/telemetry/IoT text	absent	PASS
TC-18	Pages	Unknown URL	"Page not found"	PASS
TC-19	Responsive	Sidebar on mobile	hidden	PASS
TC-20	Responsive	Horizontal overflow at 390 px	scrollWidth ≤ 390	PASS
TC-21	Navigation	Mobile menu toggle	12 links shown	PASS
TC-22	Navigation	Tap mobile link	scrolls to `#conclusion`, menu closes	PASS
TC-23	Stability	JavaScript page errors	none	PASS

Manual/visual checks: screenshots in `screenshots/` reviewed for readability and layout.

16 — Traceability Matrix

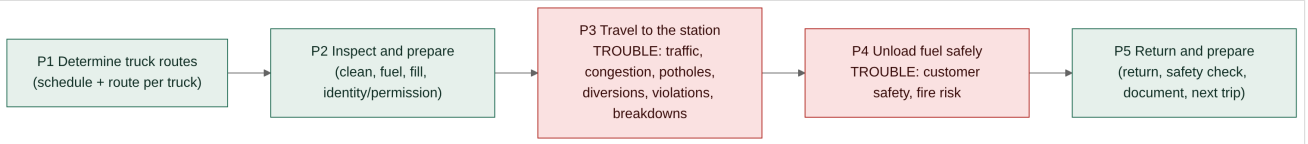
Only evidence-backed links are listed. "—" means no supported relationship.

Academic requirement	Process stage	Proposed solution	Interface (section)	Component	Source code	Test
Case for action & vision	BPR step 1	Improve efficiency, then transport	Case & vision	`Index`	`index.tsx #case`	TC-03
Process identification (P3, P4 in trouble)	P1–P5	Focus on P3/P4	Current process	`Index` + stage buttons	`currentStages`	TC-06
Delivery delay / congestion	P3	City entry/exit scheduling; station prediction	Problems; Comparison	`Index`, `Button`	`problems`, `comparisons[2]`	TC-09–12
Breakdowns	P3	Backup truck, spare parts, rapid teams	Problems; Commitment; Comparison	`Index`	`problems`, `comparisons[1]`	TC-12
Communication difficulty	P3	Communication device per truck	Enablers; Design; Comparison	`Index`	`enablers[1]`, `comparisons[3]`	TC-12
Unloading safety / fire risk	P4	Fire alarms, safety tools, signs, procedures	Problems; Enablers; Comparison	`Index`	`enablers[4]`, `comparisons[4]`	TC-12
Older trucks	P2/P3	Newer, larger fuel-efficient trucks	Commitment; Design	`Index`	`comparisons[0]`	TC-14
Driver performance	P3	Driver development	Design; Comparison	`Index`	`comparisons[5]`	TC-12
Management commitment + costs	BPR step 3	Trucks, equipment, backup truck	Commitment	`Index`	commitment section	TC-14
Design enablers	BPR step 4	5 enablers	Enablers	`Index`	`enablers`	TC-03
Process understanding, stakeholders	BPR step 5	—	Understanding	`Index`	understanding section	TC-03
Creative process design	BPR step 6	5 proposals	Creative design	`Index`	design section	TC-03
Flowchart	P1–P5	—	Flowchart	`ProcessFlow`	`ProcessFlow.steps`	TC-07, TC-08
Activity chart	P1–P5	—	Activity chart	`Index`	`activityRows`	TC-13
Conclusion	—	—	Conclusion	`Index`	`#conclusion`	TC-03

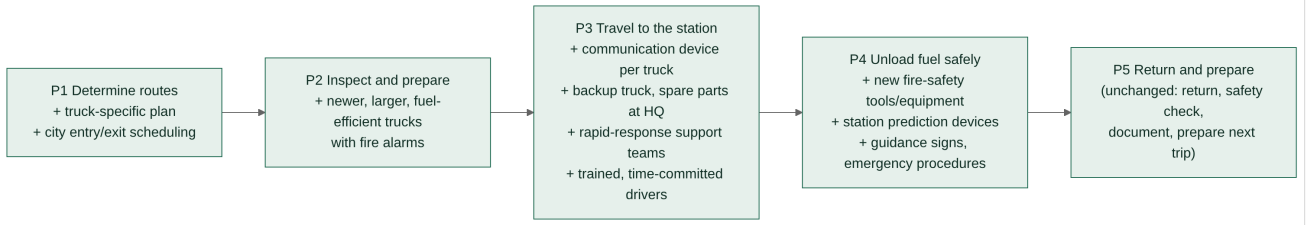
17 — Academic Diagrams

Mermaid source (`.mmd`), vector (`.svg`) and image (`.png`) versions are in diagrams/.

17.1 Current process flowchart (P1–P5) [ACAD]

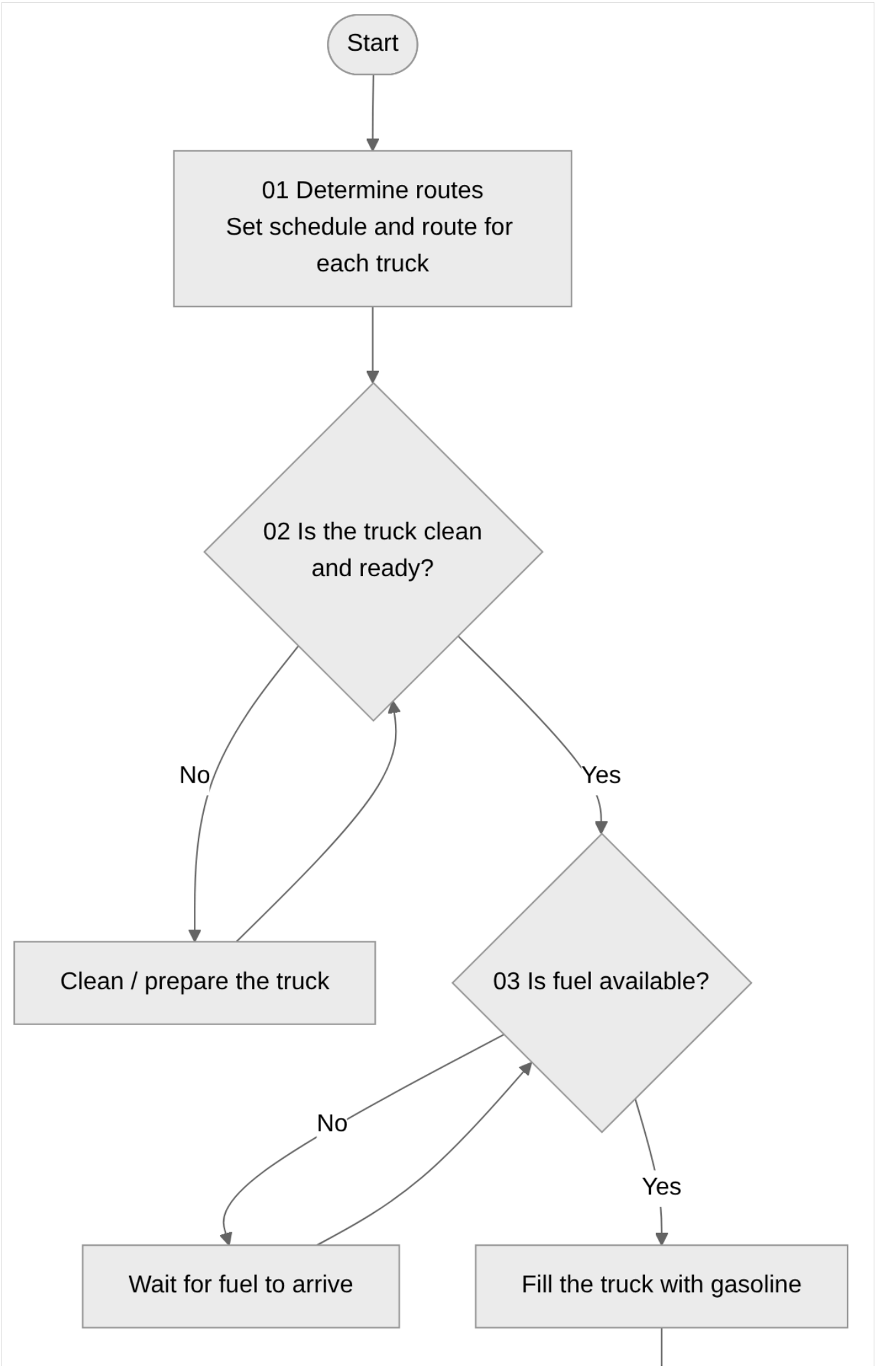


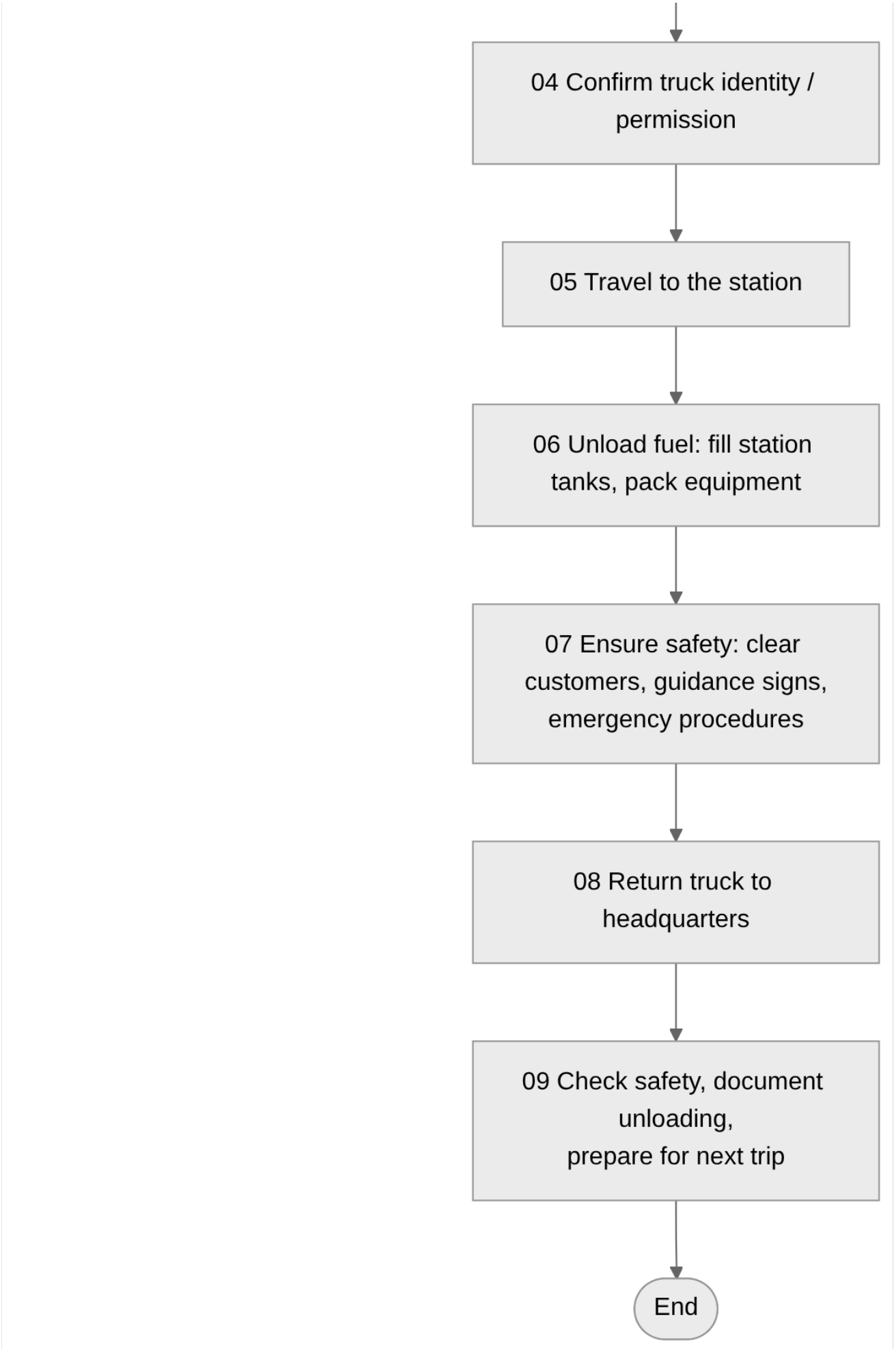
17.2 Proposed process flowchart [PROP]



17.3 Detailed process flowchart (activity diagram) [ACAD]

Preserves the two documented decisions: truck cleanliness and fuel availability (wait if unavailable). The "clean/prepare the truck" loop is drawn as the "No" branch of the cleanliness check.


Start
01 Determine routes
Set schedule and route for each truck
02 Is the truck clean and ready?
No
Yes
Clean / prepare the truck
03 Is fuel available?
No
Yes
Wait for fuel to arrive
Fill the truck with gasoline


04 Confirm truck identity / permission
05 Travel to the station
06 Unload fuel: fill station tanks, pack equipment
07 Ensure safety: clear customers, guidance signs, emergency procedures
08 Return truck to headquarters
09 Check safety, document unloading, prepare for next trip
End

17.4 Activity chart — "Delivering fuel process" (date 09-04-2025)

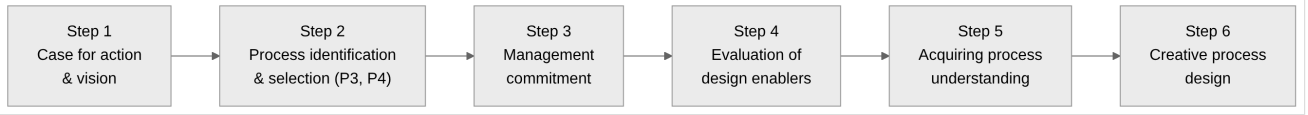
[ACAD]

Time units and value classifications are **not specified** in the source and are not inferred.

No.	Activity	Time	Value code	Sequence / decision
01	Set a schedule for each truck	12	Not classified	Start
02	Make sure the truck is clean	20	Not classified	Decision: clean?
03	Filling the truck with gasoline	16	Not classified	Decision: fuel available?
04	Identity verification	6	Not classified	—
05	Arrival time	30	Not classified	—
06	Packing equipment	8	Not classified	—
07	Filling tanks with fuel	28	Not classified	—
08	Return trucks	30	Not classified	—
09	Ensure the safety of the truck	5	Not classified	End

Symbol legend shown in the source: ○ Operation · □ Inspection · → Transport · D Delay · ∇ Storage. Per-row symbol assignments are not reproduced because they could not be verified.

17.5 BPR process model [ACAD]



18 — Limitations and Future Enhancements

18.1 What the project does NOT implement

- No operational software for the gasoline company.
- No database, accounts, login, roles, forms or data storage.
- No APIs, server functions, integrations or payment systems.
- No GPS tracking, IoT, real-time telemetry or live monitoring.
- No actual scheduling software or station prediction devices (proposed business enablers only).
- No measured before/after results; improvements are qualitative.
- Activity chart value codes, time units and per-row symbols are not specified in the source.
- The management cost total is ambiguous and not recalculated; currency is unstated.
- Content is English only; light theme only is styled for the presentation.

18.2 Future Enhancements — NOT CURRENTLY IMPLEMENTED

- Print/PDF export button on the website.
- Arabic language version (RTL) of the presentation.
- Presenter mode (one section per screen, keyboard paging).
- Downloadable activity chart and flowchart images from the page.
- If the company later pursues the proposals, a separate requirements study for scheduling and communication tools.

19 — Academic Project Summary

Problem. Transporting gasoline from headquarters to gas stations had become expensive and difficult, and customers complained that fuel arrived late. Road travel (P3) and unloading (P4) were identified as the processes in trouble.

Analysis. The team studied contracts, supply agreements and delivery schedules, interviewed stakeholders, and examined delivery times, inventory management and demand forecasting. Stakeholders (suppliers, distributors, gas station operators, regulatory bodies) and customer segments (individual consumers, businesses, fleet operators) were identified.

BPR. Six steps were applied: case for action and vision, process identification and selection, management commitment, evaluation of design enablers, acquiring process understanding, and creative process design.

Current process. Determine routes → inspect and prepare (clean, fuel check, fill, identity/permission) → travel → unload safely → return, document and prepare for the next trip. Bottlenecks: delays, road conditions, congestion, breakdowns, unloading safety and fire risk.

Proposed process. Newer, larger, fuel-efficient trucks with fire alarms; a backup truck and spare parts; communication devices in trucks; rapid support teams; truck-specific plans and city entry/exit scheduling; station prediction devices; new fire-safety equipment; and driver development. Management approval was requested for newer trucks, safety equipment and a backup truck.

Expected improvement. Qualitative: fewer delays and waits, safer unloading, faster recovery from breakdowns and lower operating costs — "the company's position will be improved for the better." No quantitative results are claimed.

My role. I led and oversaw the project, focusing on Business Process Reengineering. I worked on supply-chain and process improvement and on strategic planning, concentrating on operational efficiency, communication and tracking of trucks during problems, safety, waiting time and operating costs.

Deliverable. A static, responsive academic presentation website (https://fuel-flow-revamped.lovable.app) and this documentation package.

Documentation Audit

Documents created

README.md, 01–19 (19 documents), DOCUMENTATION-AUDIT.md, documentation.html, Gasoline-Flow-Redesign-Documentation.pdf.

Diagrams created (`diagrams/`, each as .mmd + .svg; PNG for all except ui-state)

current-process, proposed-process, flowchart (detailed activity diagram), bpr-model, presentation-architecture, ui-state. Inline Mermaid: use-case diagram (08), sequence diagram (09).

Screenshots (`screenshots/`)

17 captures of the running site: 12 desktop sections, 5 interaction states (P3 selected, step 07 selected, current-only, proposed-only), 2 mobile (overview, menu open).

Source files analysed

`src/routes/index.tsx`, `src/routes/__root.tsx`, `src/components/ui/button.tsx`, `src/lib/utils.ts`, `src/router.tsx`, `src/styles.css`, `package.json`, `vite.config.ts`, `AGENTS.md`, `README.md`, file tree of `src/` and `public/`. Template files (`server.ts`, `start.ts`, `lib/error-*`, unused `components/ui/*`, `hooks/use-mobile.tsx`) were identified but not documented in depth.

Pages analysed

`/` (12 sections) and the 404 page.

Workflows documented

Current process P1–P5; proposed process; detailed 9-step flowchart with 2 decisions; activity chart (9 rows); BPR steps 1–6; website interactions UC-1…UC-5.

Database information verified

No database, backend, API route or server function exists — confirmed by source inspection.

Could not be verified

- The original academic PDF was **not accessible** in the workspace during this documentation task. Academic content was taken from the website, which was built from an earlier parse of that PDF. Re-checking against the PDF is recommended.
- Activity-chart time units, value codes and per-row symbols.
- The management cost total and currency.

- Formal actor responsibilities (no RACI in source).

Assumptions (clearly labelled)

- **A1:** "Stages 1–6" refers to the six BPR methodology steps in the order presented on the website.
- **A2:** Actor responsibilities marked *(derived)* in doc 07 are inferred from process wording.
- **A3:** In the detailed flowchart, the "No" branch of the cleanliness check is drawn as "clean/prepare the truck" and loops back.
- **A4:** The "My role" statement in doc 19 is based on the user's own description.

Website unchanged

No website file was modified; the custom favicon remains in place.