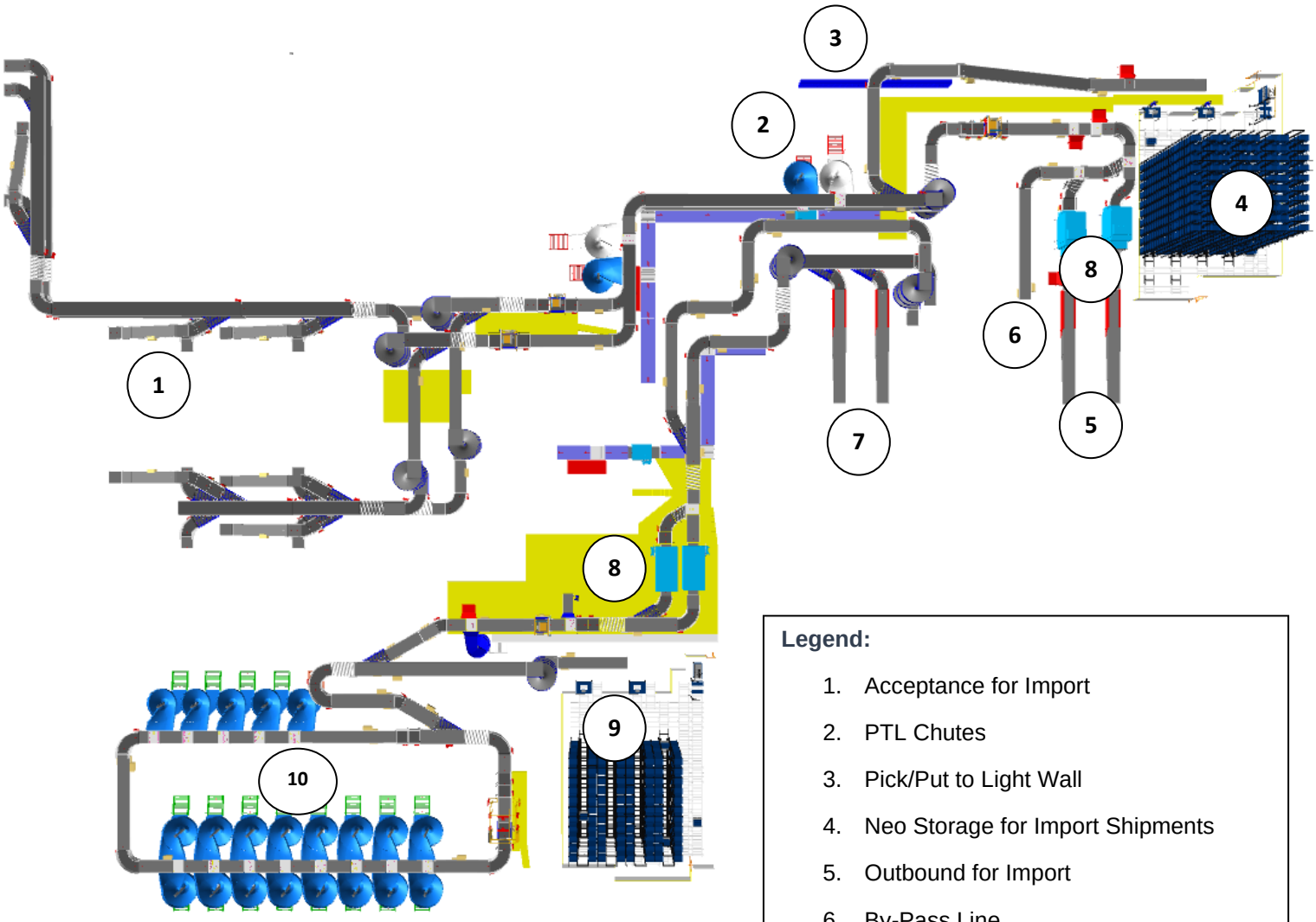
7. Proposed System Description

7.1 Objective

The purpose of this proposal is to present the design, manufacturing, installation, commissioning, testing, and acceptance testing of the Conveyor Automation, as per Dnata's requirements.

7.2 Layout Overview

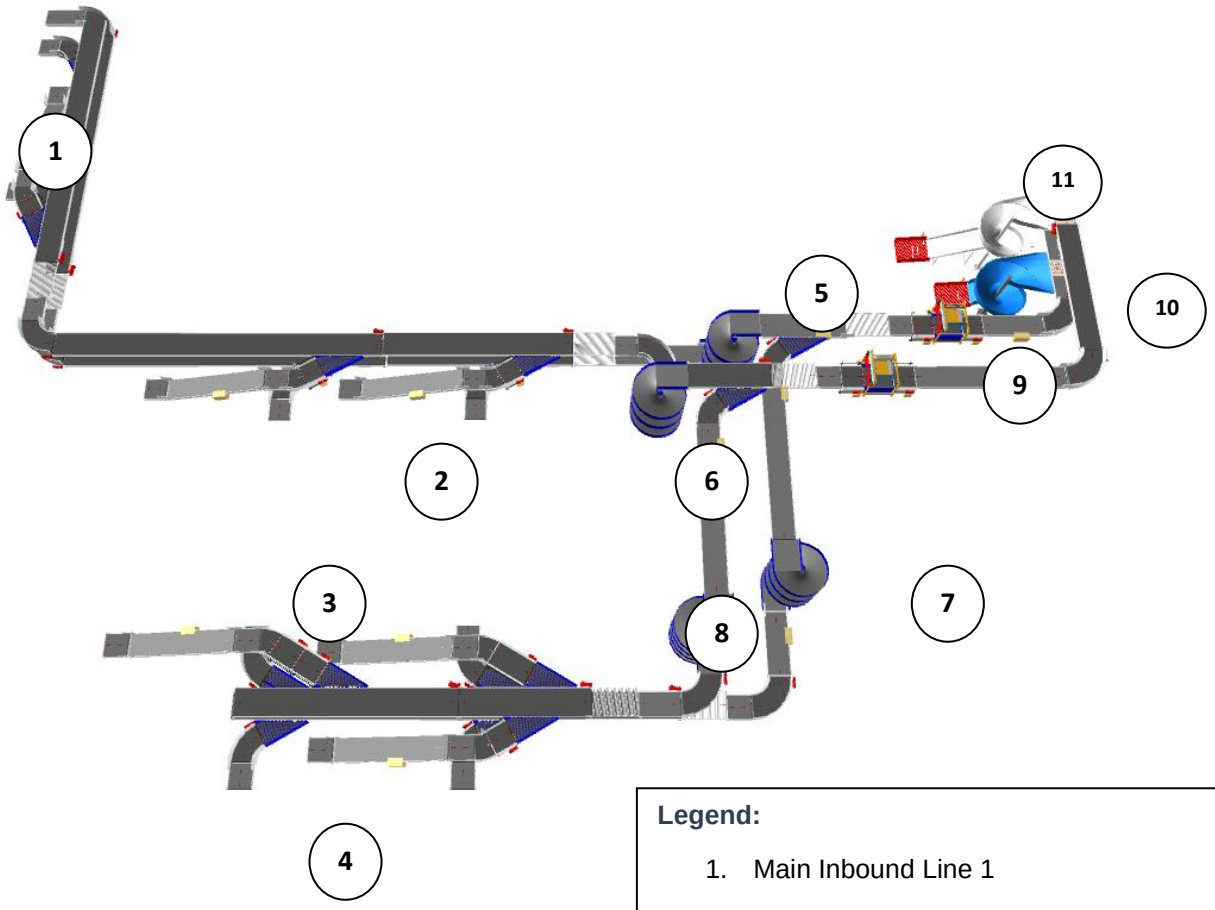


Legend:

1. Acceptance for Import
2. PTL Chutes
3. Pick/Put to Light Wall
4. Neo Storage for Import Shipments
5. Outbound for Import
6. By-Pass Line
7. Acceptance for Export
8. X-ray and Police Inspection
9. Neo Storage for Export Shipments
10. Outbound Sorter for Export

7.3 Process Flow of the System

7.3.1 Acceptance for Import

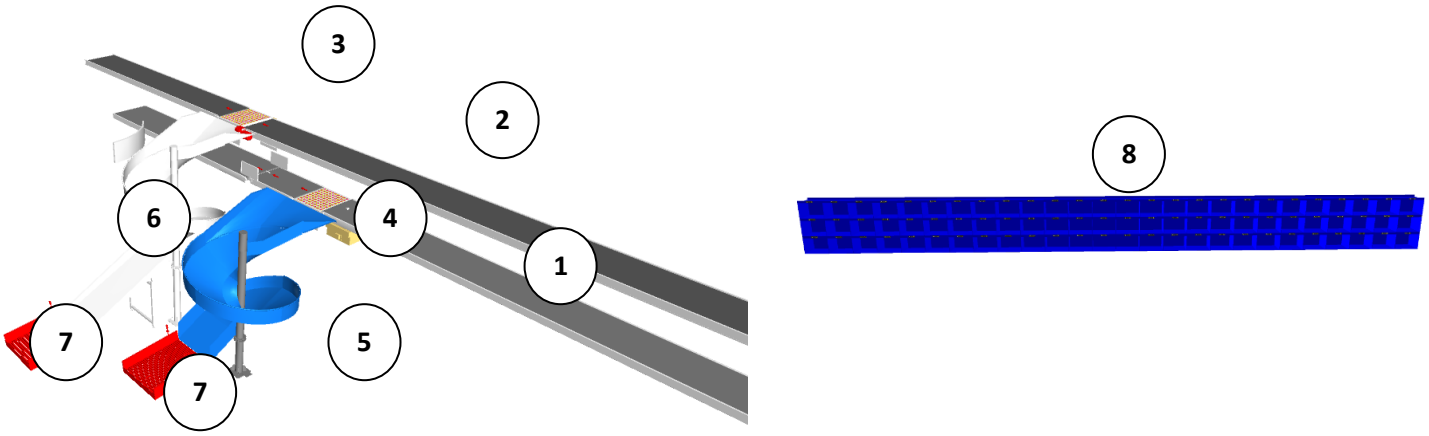


Legend:

1. Main Inbound Line 1
2. Contingency Inbound 1
3. Contingency Inbound 2
4. Main Inbound Line 2
5. Contingency Line Spiral Conveyor 1
6. Main Inbound Line Spiral Conveyor 1
7. Contingency Line Spiral Conveyor 2
8. Main Inbound Line Spiral Conveyor 2
9. Barcode Scanning, Weighing and VMS tunnel
10. Rejection Chute
11. Contingency Rejection Chute

Import shipments will be loaded onto inbound conveyor lines from multiple sides. Two conveyors are in operation: the primary inbound conveyor and a contingency conveyor positioned above it. Each conveyor is linked to its respective spiral. Once shipments enter the spiral, they are automatically aligned, scanned for their top-side barcode, and measured for weight and volume. If no discrepancies are detected, they proceed to the next stage; otherwise, they are diverted to the rejection chute.

7.3.2 Pick/Put to Light Sorting

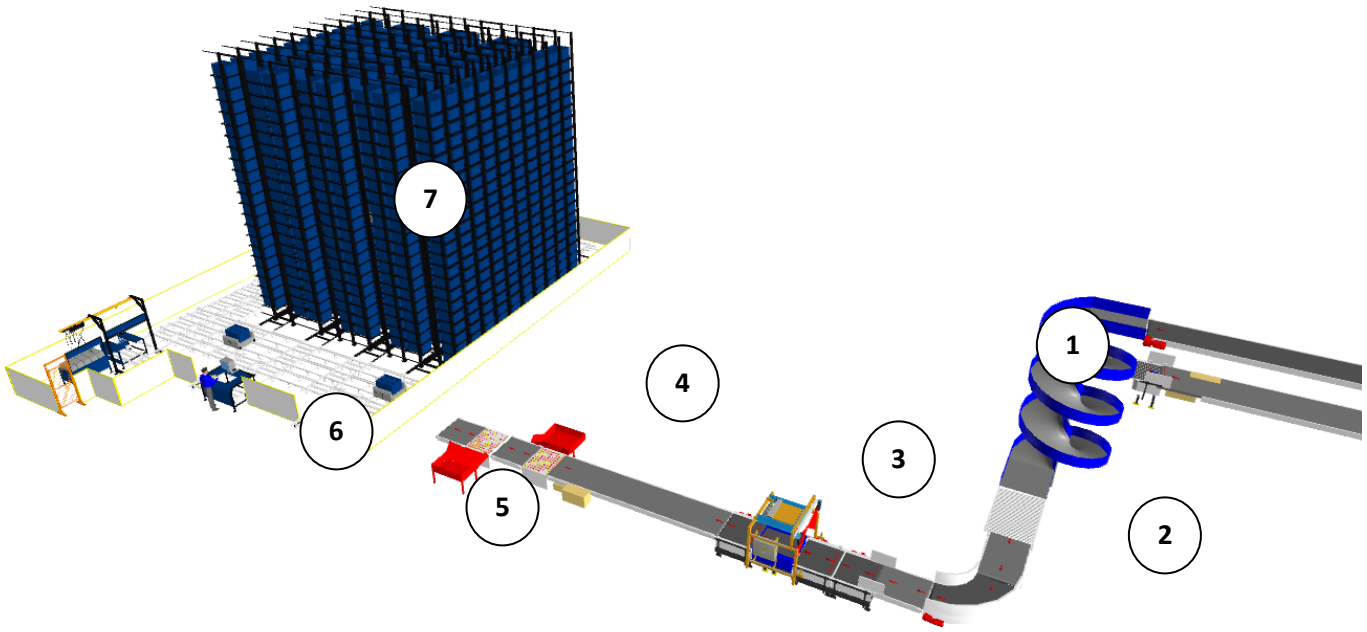


Legend:

1. Main Inbound Conveyor Line
2. Contingency Conveyor Line
3. Swivel Wheel Divert Unit for Inbound Conveyor Line
4. Swivel Wheel Divert Unit for Inbound Contingency Line
5. PTL Chute for Inbound Line
6. PTL Chute for Contingency Line
7. Gravity Roller Chute
8. Pick/Put to Light Wall

Boxes with scanned barcodes that require sorting into PTL chutes will be redirected to their designated chutes via the swivel wheel divert. This process occurs on both conveyor lines. Once sorted, operators will retrieve the boxes, open them, and scan the product barcodes using a handheld scanner. After scanning, a light will illuminate on the PTL wall, indicating where the product should be placed in its assigned pigeonhole.

7.3.3 NEO Storage for Import Shipments



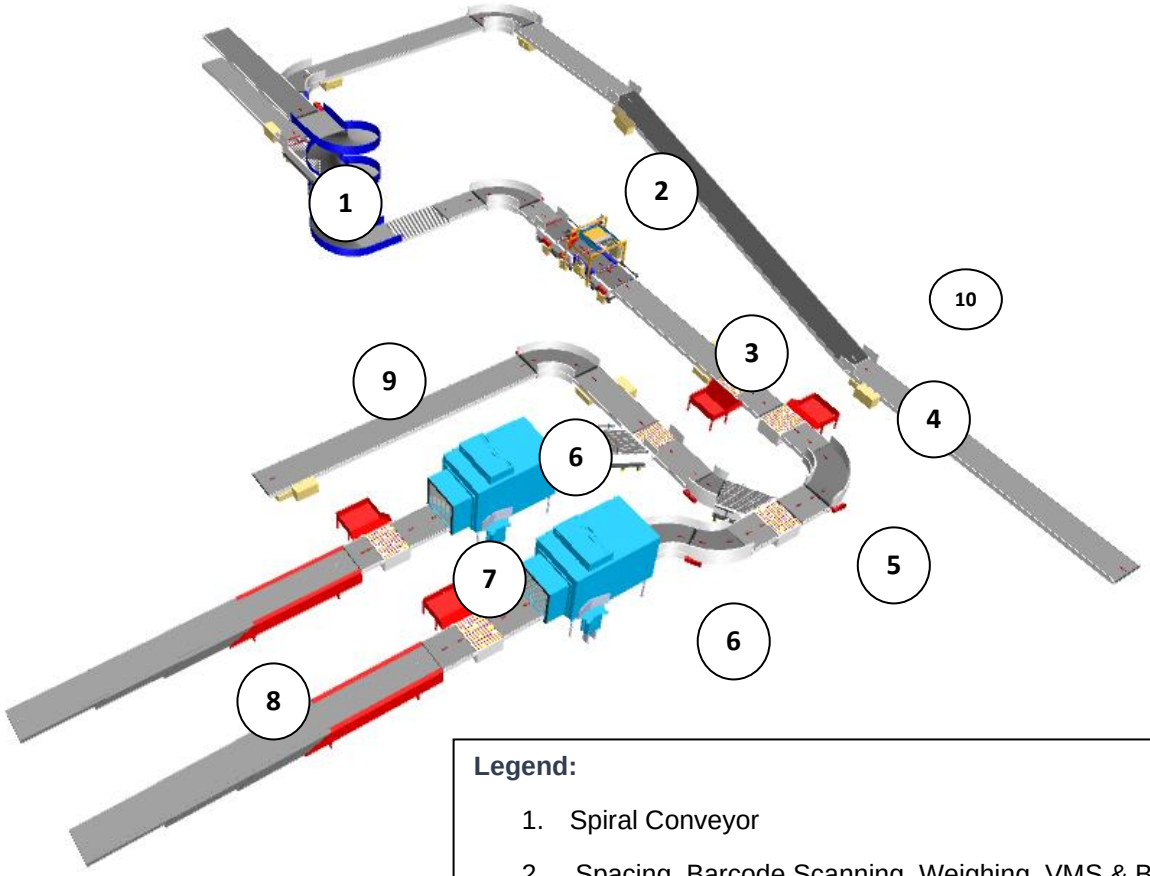
Legend:

1. Spiral Conveyor
2. Aligning Conveyor
3. Spacing, Barcode Scanning, Weighing, VMS & Buffer
4. Rejection Chute
5. NEO Storage sorting chute
6. NEO Stations
7. NEO Storage

Boxes arriving for NEO will enter through the spiral via the inbound lines. They will first undergo automatic centre alignment, will get equally Spaced, Barcodes will get scanned from the top side, weighing, volume measurement, and buffering. Any boxes with barcode discrepancies will be directed to the rejection chute, while the remaining ones will be sorted into NEO storage.
Operators will then retrieve the boxes from the NEO chute and place them into storage.

Note:** **Only the boxes/bags with dimensions 760 x 520 x 410 mm and weight of 40 kgs will be stored in NEO storage.

7.3.4 Outbound for Import



Legend:

1. Spiral Conveyor
2. Spacing, Barcode Scanning, Weighing, VMS & Buffer
3. Rejection Chute
4. NEO Storage sorting chute
5. Swivel Wheel Divert Unit
6. X-ray Machine
7. Rejection Chutes
8. Outbound Telescopic Belt Conveyors
9. By-Pass lane
10. NEO Storage Outbound Line

Outbound lines are linked to inbound lines via the spiral, allowing shipments to move through it to reach the outbound line. Along the way, shipments will be equally spaced, barcode will be scanned from topside, weight will get captured, volume will be scanned, and buffering is done. Based on barcode scanning results, boxes will be directed to their designated outbound lines using the swivel wheel divert unit. Boxes requiring X-ray scanning will be routed to a dedicated line, while others will be directed to the bypass line.

To streamline loading, telescopic belt conveyors are planned at the end of the outbound line. Additionally, a NEO outbound line is designated for shipments headed to the storage area, which is also connected to the outbound line through the spiral.

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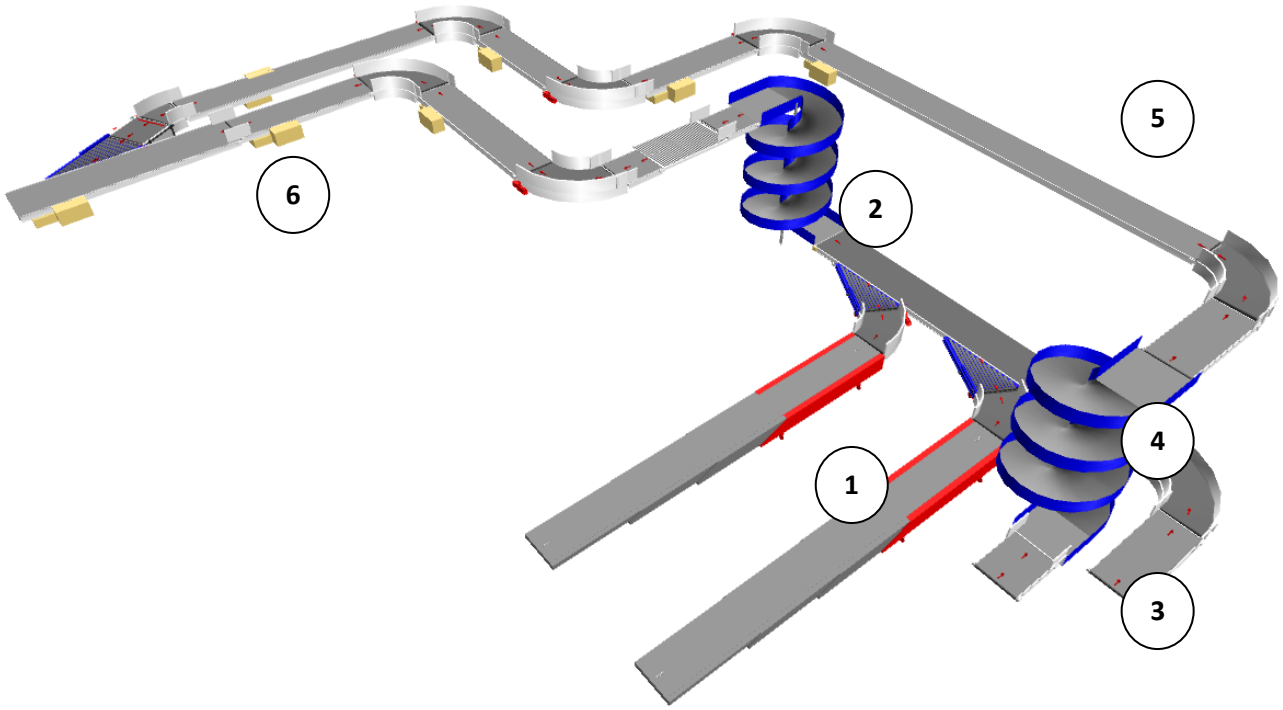
7.3.5 Inbound for Export

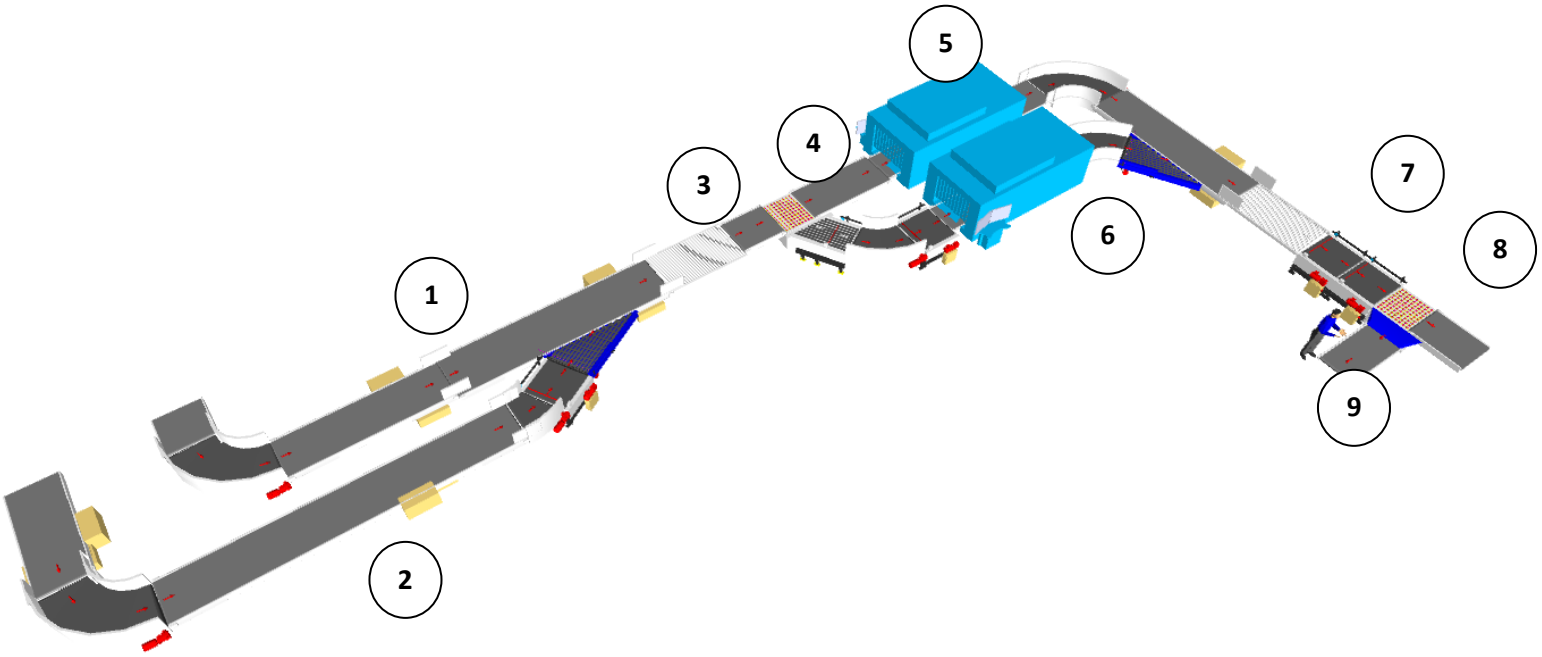


Legend:

1. Main Inbound Line for Export
2. Main Inbound Spiral Conveyor
3. Contingency Inbound Line
4. Contingency Spiral Conveyor
5. Contingency Takeaway Conveyor line
6. Main Inbound Takeaway Conveyor Line

Export shipments will be loaded through the main inbound line or the contingency inbound line. Both lines are connected to their respective spiral conveyors, which are further connected to the main takeaway line for further processing.

7.3.6 X-ray and Police Inspection Process



Legend:

1. Main Inbound Takeaway Line
2. Contingency Inbound Takeaway Line
3. Side Aligning Conveyor – 1
4. Swivel Wheel Divert Unit for Volume Distribution
5. X-Ray Line 1
6. X-Ray Line 2
7. Side Aligning Conveyor -2, Spacing Conveyor
8. Swivel Wheel Divert Unit for Sorting
9. Polic Inspection Collection Conveyor

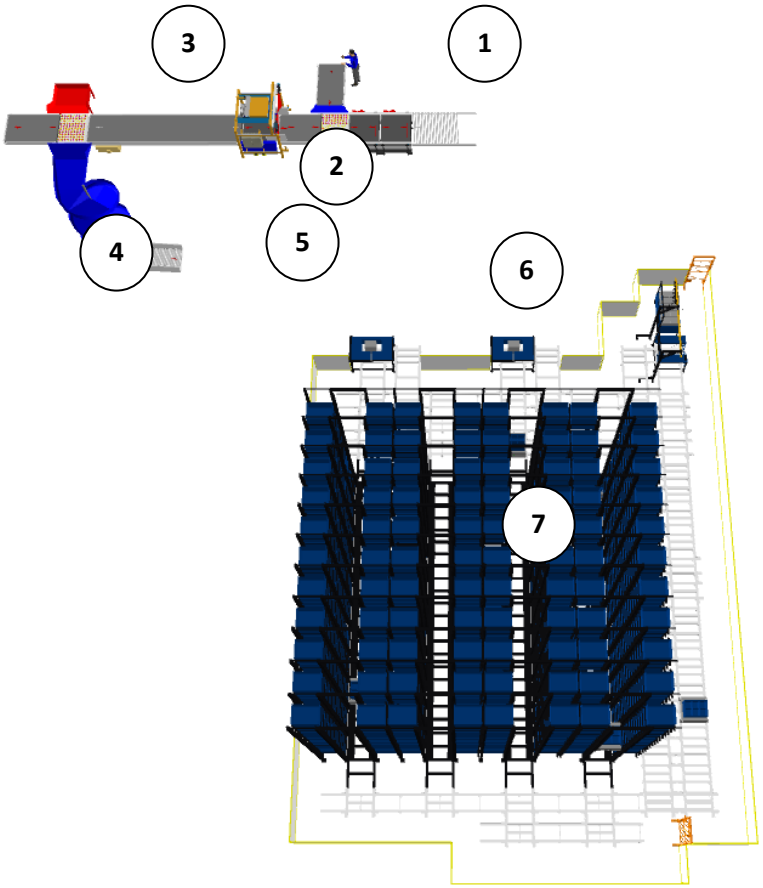
Note: X-ray machines are not in Falcon's Scope.

Shipments arriving via the export inbound lines will be automatically aligned using a side-aligning conveyor and distributed based on volume through a swivel wheel diverter. They will then proceed through X-ray machines on their designated lines.

After the X-ray screening, shipments will be realigned and evenly spaced. Those requiring police inspection will be directed to the police inspection conveyor using the swivel wheel diverter, following sortation logic provided by the X-ray machines.

An operator will then process these shipments and re-induct them to the main conveyor line.

7.3.7 NEO Storage for Export



Legend:

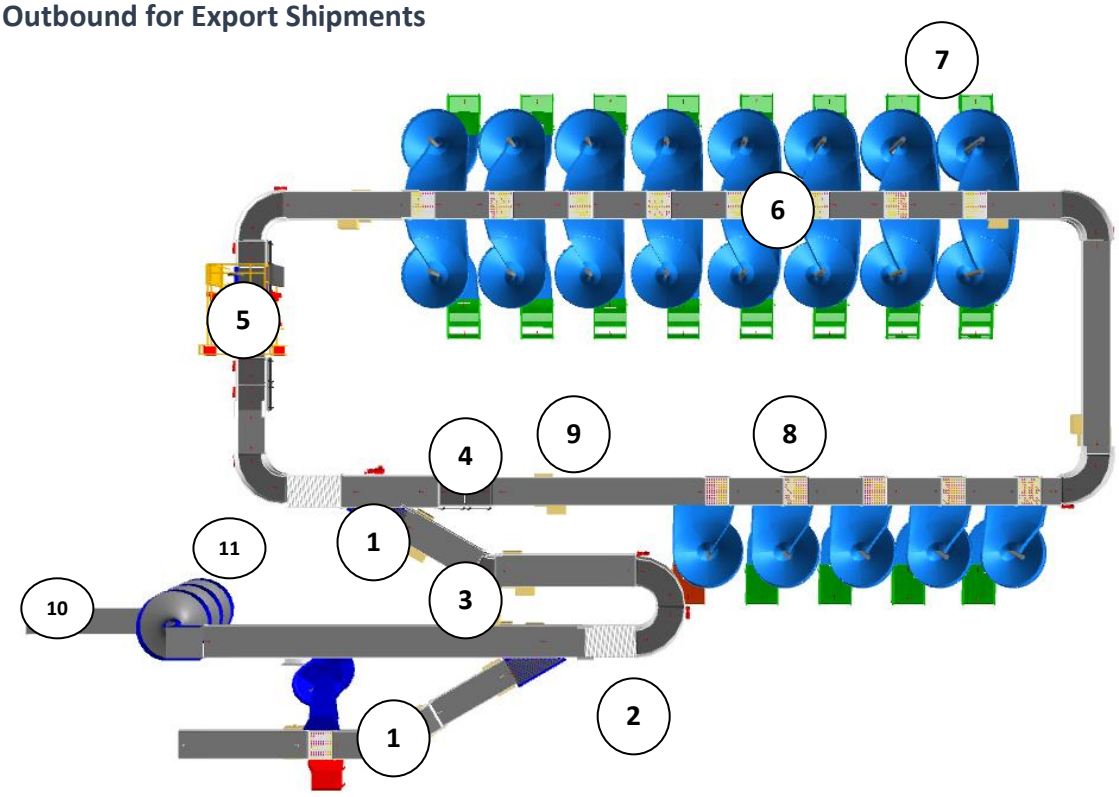
1. Police Inspection Line
2. Barcode Scanning, Weighing and VMS Tunnel
3. Rejection Chute
4. Spiral Chute for NEO Storage
5. Gravity Roller Conveyor
6. NEO Stations
7. NEO Storage for Export Shipments

After the X-ray and police inspection process, shipments will undergo barcode scanning, weight scanning, and volume measurement. Based on barcode scanning, shipments that need to be sorted into NEO storage will be diverted to their respective chutes using Swivel Wheel Divert Unit. Shipments with barcode discrepancies will be sorted into the rejection chute.

Operators will pick the shipments from the NEO spiral chute and put them away into storage using the NEO bot.

Note:** **Only the boxes/bags with dimensions 760 x 520 x 410 mm and weight of 40 kgs will be stored in NEO storage.

7.3.8 Outbound for Export Shipments



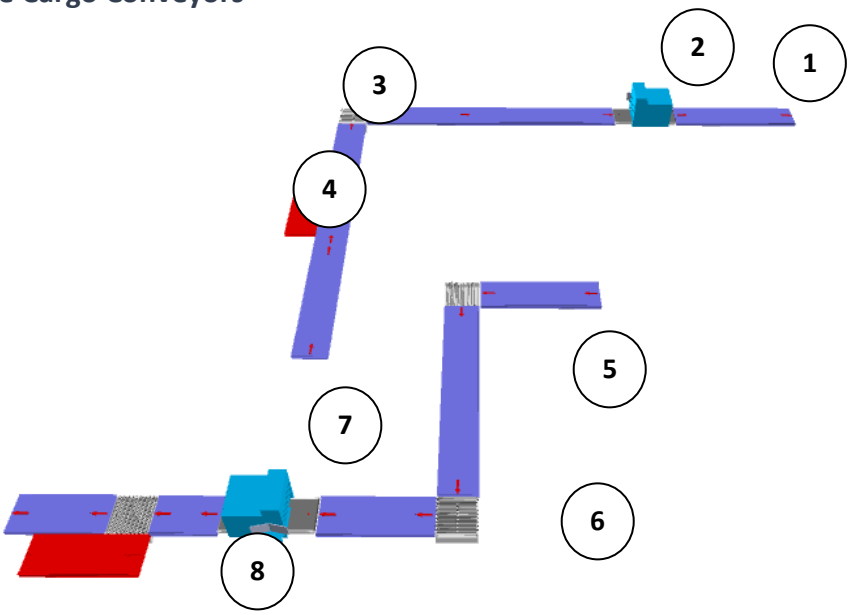
Legend:

1. Spiral Chute for NEO Storage
2. Merging onto Highway Conveyor
3. Highway Conveyor
4. Merging onto Sorter Loop
5. Barcode Scanning, Dimensioning, Weighing and Volume Measurement Tunnel
6. Swivel Wheel Divert Sorter
7. Outbound Collection Chutes
8. Rejection Chute
9. Spacing Conveyors
10. NEO export shipments loading Conveyor
11. Spiral Conveyor

Shipments that are not directed into the NEO spiral chute will be transferred onto the highway conveyor, which subsequently merges with the Swedi sorter loop. Once on the Swedi sorter loop, shipments will go through top-side barcode scanning, dimensioning, weighing, and volume measurement. Based on the barcode scan, the Swedi sorter will activate and direct shipments into their designated chutes, while rejected shipments will be sent to rejection chutes.

Additionally, a dedicated line has been provided for NEO storage export parcels. Shipments exiting NEO storage will be manually loaded onto the NEO export shipments loading conveyor by operators. These shipments will then merge onto the highway conveyor via the spiral conveyor and continue to the outbound sorter for export processing.

7.3.9 Oversize Cargo Conveyors



Legend:

1. Oversize Cargo Conveyor for Import
2. X-ray Machine for Import
3. Pop Up Diverter
4. Rejection Conveyor
5. Oversize Cargo Conveyor for Export
6. Pop Up Diverter
7. X-Ray Machine
8. Rejection Conveyor

The solution includes automation for oversize cargo conveyors, which operate beneath the main conveyor automation system. Operators will place oversize and overweight shipments on these conveyors to facilitate easier handling.

7.3.10 Pallet Roller Conveyor for Oversize Cargo

For heavy-load applications, our roller conveyors offer a reliable and energy-efficient material movement solution to seamlessly navigate pallets around turns, rotations, and transfers.

Specification	UOM	Remark
Max Load Capacity	Kg/m	700
Conveyor Speed	m/s	0.1-0.3
Rollers	Type	Dia80/89 mm Zn Plated Sprocket Welded rollers
Ambient Temperature	Celsius	0-45
Pallet Specifications	mm	800 x 1200 / 1000 x 1200 / 1200 x 1200
Conveying Height	mm	400 – 1200
Module Length	meters	1.5 – 3

7.3.11 Pallet Roller Turntable for Oversize Cargo

Designed for heavy-duty applications, our pallet turntables effortlessly enable pallet rotation, streamlining material handling and positioning within warehouse and logistics operations.

Specification	UOM	Remark
Max Load Capacity	Kg	1000
Conveyor Speed	m/s	0.1-0.3
Rollers	Type	Dia80/89 mm Zn Plated Sprocket Welded rollers
Ambient Temperature	Celsius	0-45
Pallet Specifications	mm	800 x 1200 / 1000 x 1200 / 1200 x 1200
Conveying Height	mm	500
Diameter of Encircle	mm	2100

7.3.12 Pallet 90-Degree Popup Conveyor for Oversize Cargo

For efficient pallet transfer at 90-degree angles, our pop-up conveyor systems seamlessly move materials, enhancing operational flow and flexibility in various industrial applications.

Specification	UOM	Remark
Max Load Capacity	Kg	1000
Conveyor Speed	m/s	0.1-0.3
No. of Chain	Nos	2 or 3
Pallet Specifications	mm	800 x 1200 / 1000 x 1200 / 1200 x 1200
Conveying Height	mm	400 - 1000
Module Length	mm	1600 - 3000

7.4 Main benefits of the proposed solution

The proposed solution has the following advantages:

1. High operational throughput.
2. Improved Productivity.
3. Ability to serve entire range of conveyable Shipments with a sorter's speed of up to 2 m/s.
4. Low occupancy of floor space in the building.
5. Narrow discharge centers for the increased number of splits in limited space.
6. Designed for minimal upkeep, ensuring consistent reliability and ease of support.
7. Life Cycle Value.
8. Falcon's CBS can adapt to changing business requirements by adjusting its speed. to match the operational throughput requirement, thereby leading to Power Savings and reduced system Wear & Tear.