T-D Protocols with Embedded DSO & Host LDC

Prepared for the Transmission-Distribution Coordination Working Group (TDWG)

Supplemental to Deliverable A
June 2025

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1. Introduction

This document outlines Transmission-Distribution (T-D) coordination protocols when the parties involved include an embedded Distribution System Operator (DSO) and a host Local Distribution Company (LDC). These protocols differ from those described in the Deliverable A report 'Transmission-Distribution Coordination Protocols', which focuses solely on DSOs, DERs and DER aggregations (DER/A), and the IESO. This document examines three DSO models: Dual Participation DSO (DP-DSO), Total DSO (T-DSO), and Market Facilitator DSO (MF-DSO). For each model, protocols for five key processes are detailed: (a) day-ahead scheduling, (b) real-time dispatch, (c) DER/A outage management, (d) distribution system outages, and (e) DER/A resource plan changes. It is recommended that these protocols be reviewed after the Deliverable A report, which provides the necessary background, analysis, and baseline protocols.

The protocols are presented in the form of swim lane diagrams, which follow this layout:

- Columns represent the coordinating parties involved.
- Rows indicate specific time periods for actions.
- Boxes show the actions that each party takes.
- Lines between boxes represent data exchanges.

The swim lane diagrams in the following sections build on the swim lane diagrams in the Deliverable A report. Additional actions and information exchanges have been incorporated to enable the host LDC to establish limits at embedded DSO–host LDC interfaces within the distribution system. Furthermore, the protocols inform the host LDC of instructions to DER/A related to grid services as well as DER/A outages. Continued stakeholder feedback can further refine the protocols, which are expected to serve as the basis for evolved versions as industry collaborates and ongoing innovation drives improvements in T-D coordination.

2. Dual-Participation DSO

A. Day-Ahead Scheduling

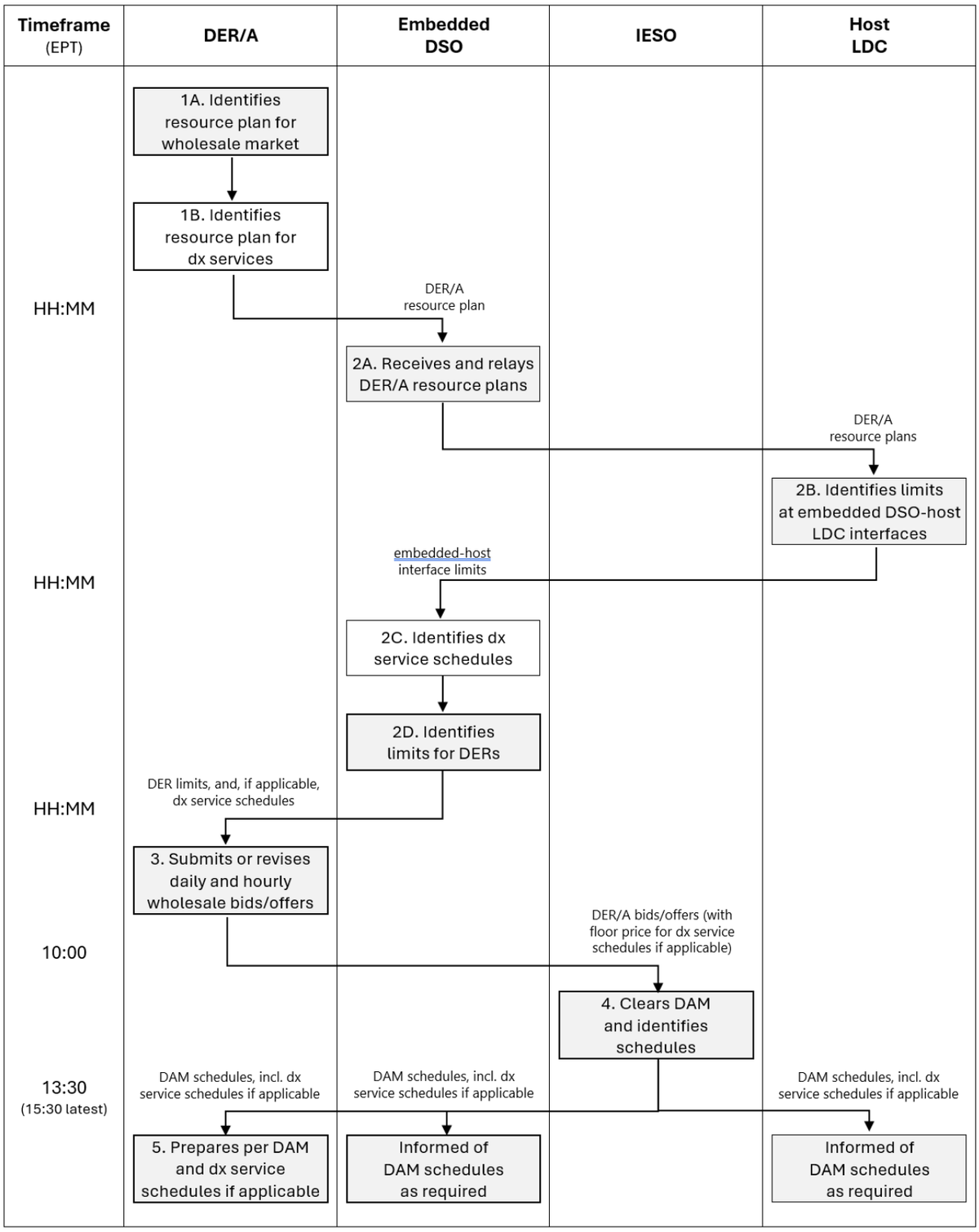

Figure 1: Protocol swim lanes for day-ahead process under DP-DSO model in EPT

B. Real-Time Activation & Dispatch

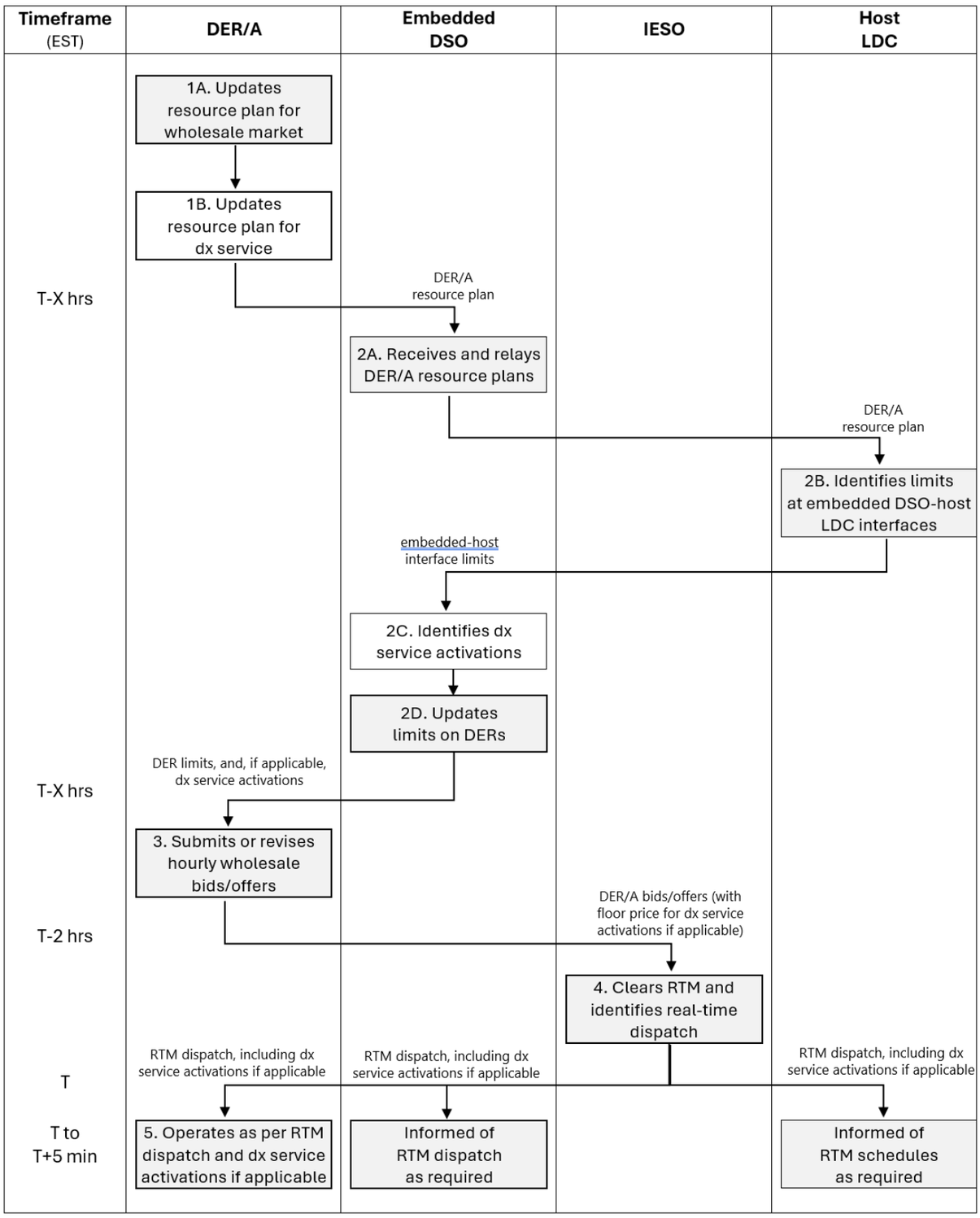

Figure 2: Protocol swim lanes for real-time process under DP-DSO model in EST

C. DER/A Outage Management

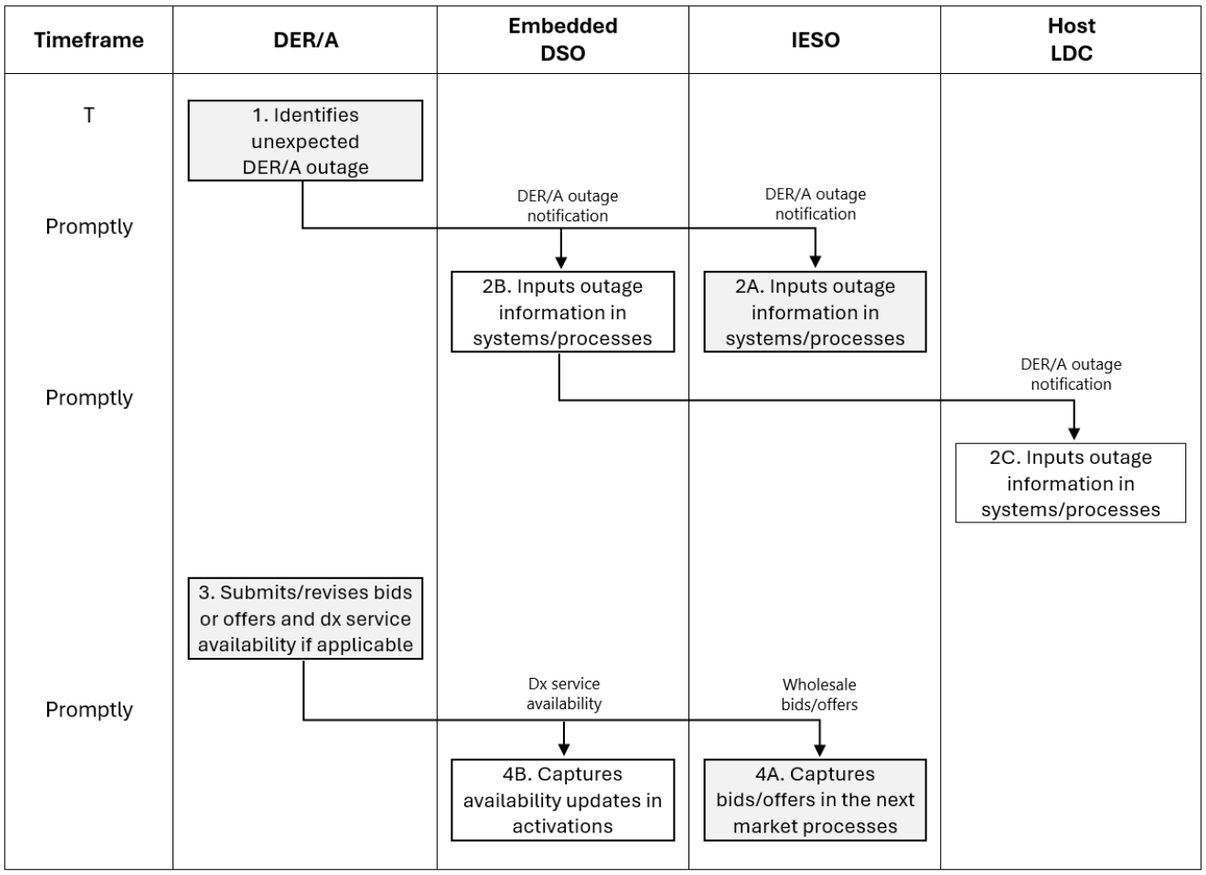

Figure 3: Protocol swim lanes for DER/A outages under DP-DSO model

D. Distribution System Override

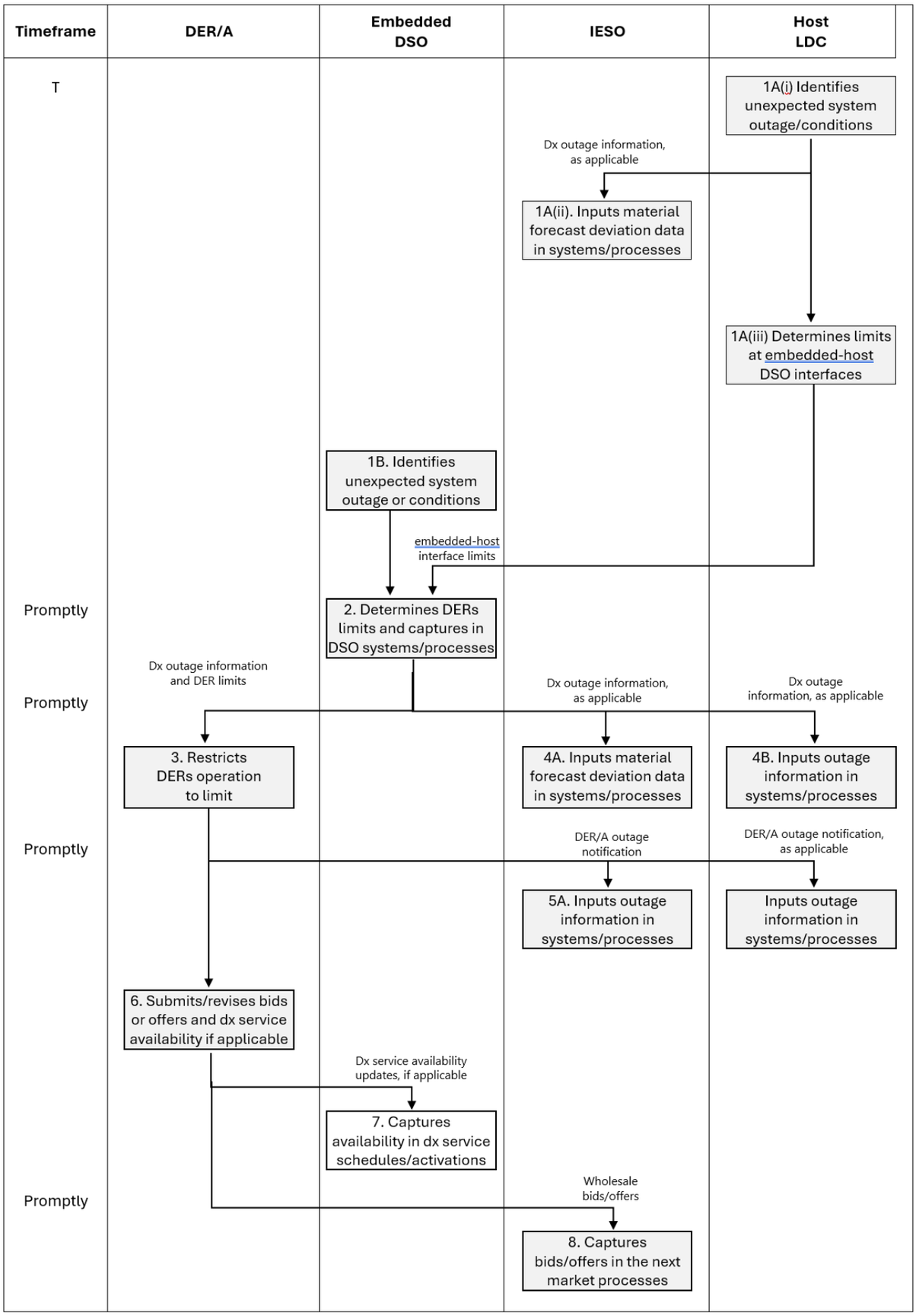

Figure 4: Protocol swim lanes for distribution system override under DP-DSO model

E. DER/A Resource Plan Changes

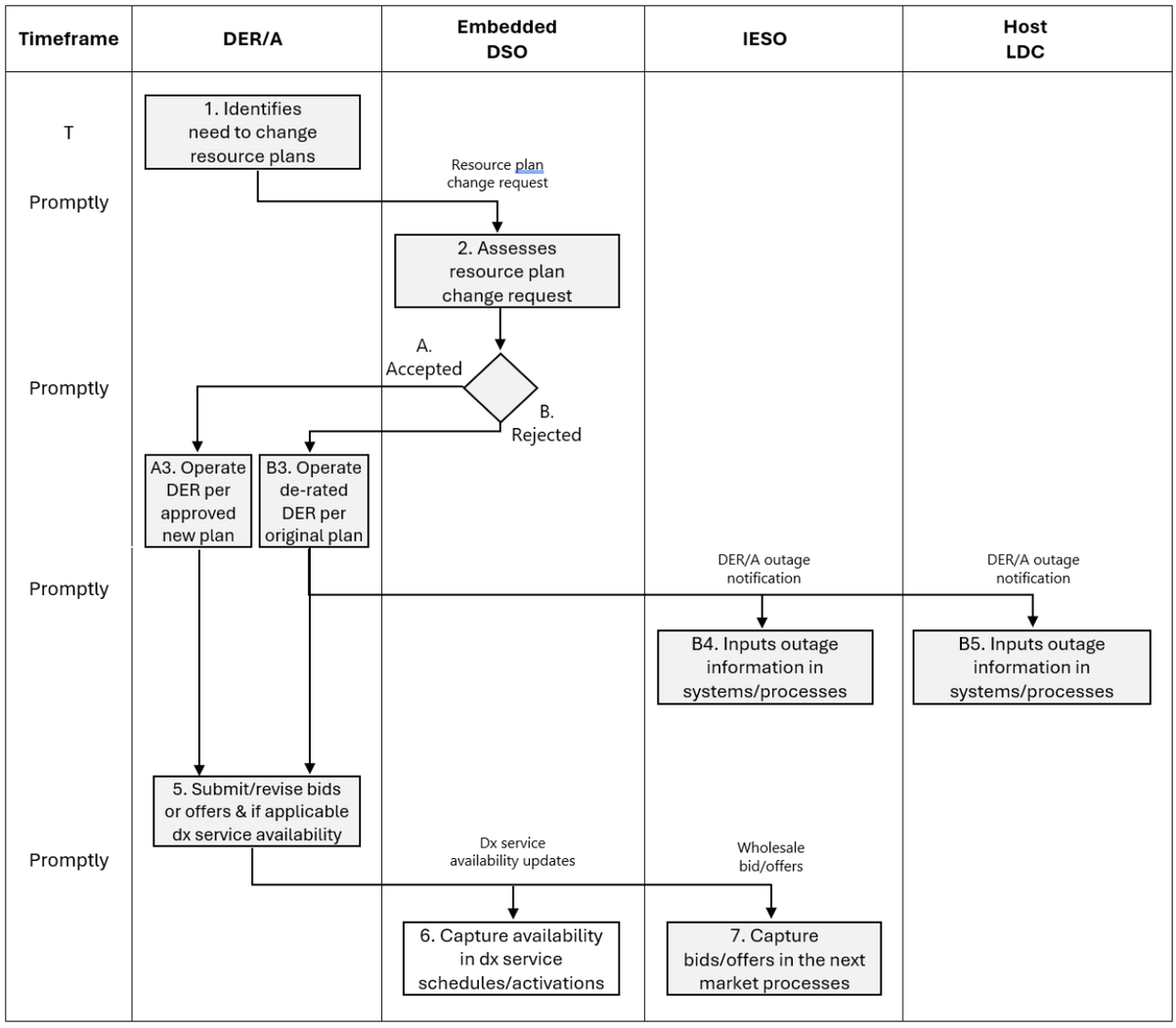

Figure 5: Protocol swim lanes for DER/A resource plan change process under DP-DSO model

3. Total DSO

A. Day-Ahead Scheduling

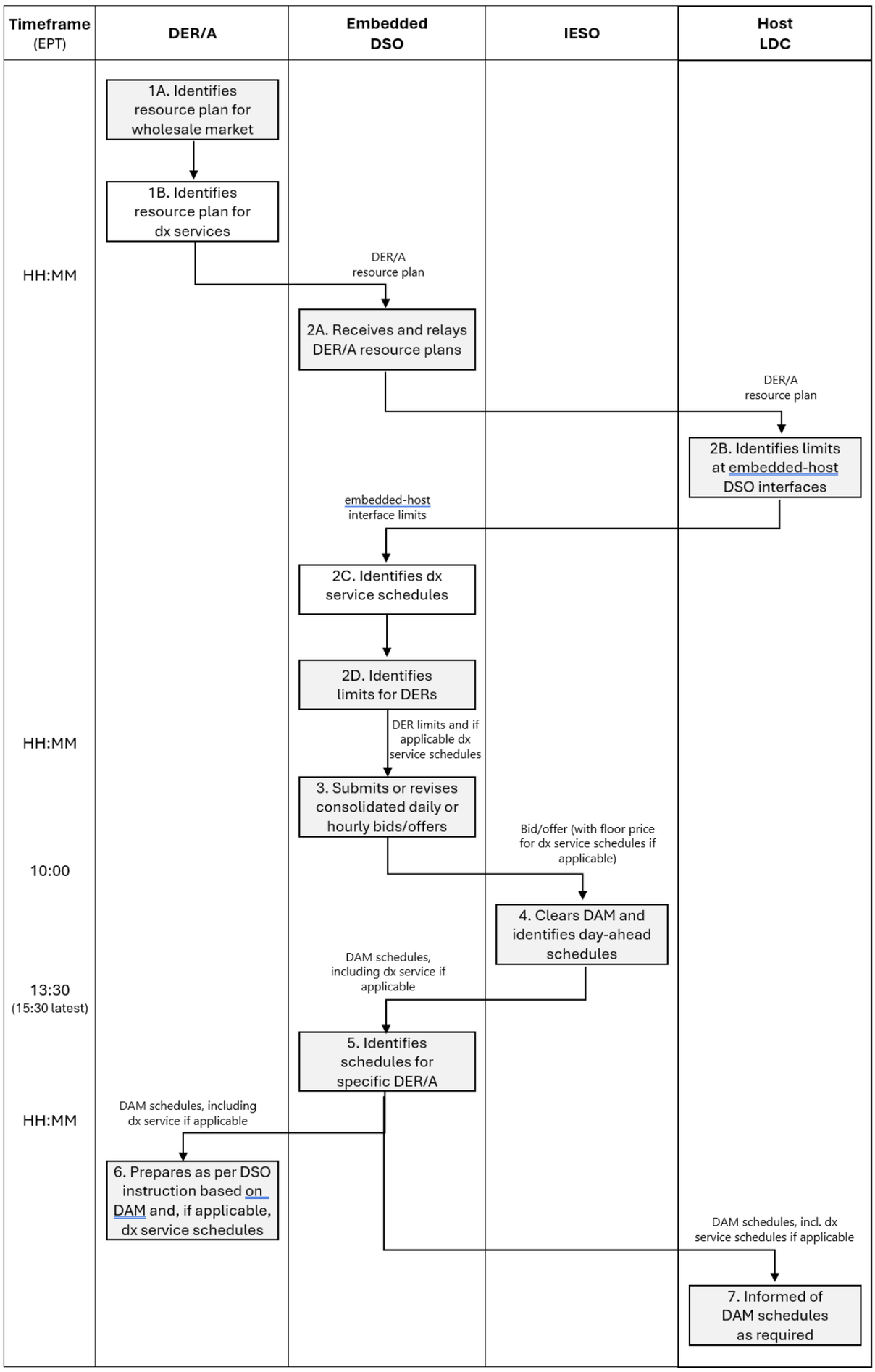

Figure 6: Protocol swim lanes for day-ahead process under T-DSO model in EPT

B. Real-Time Activations & Dispatches

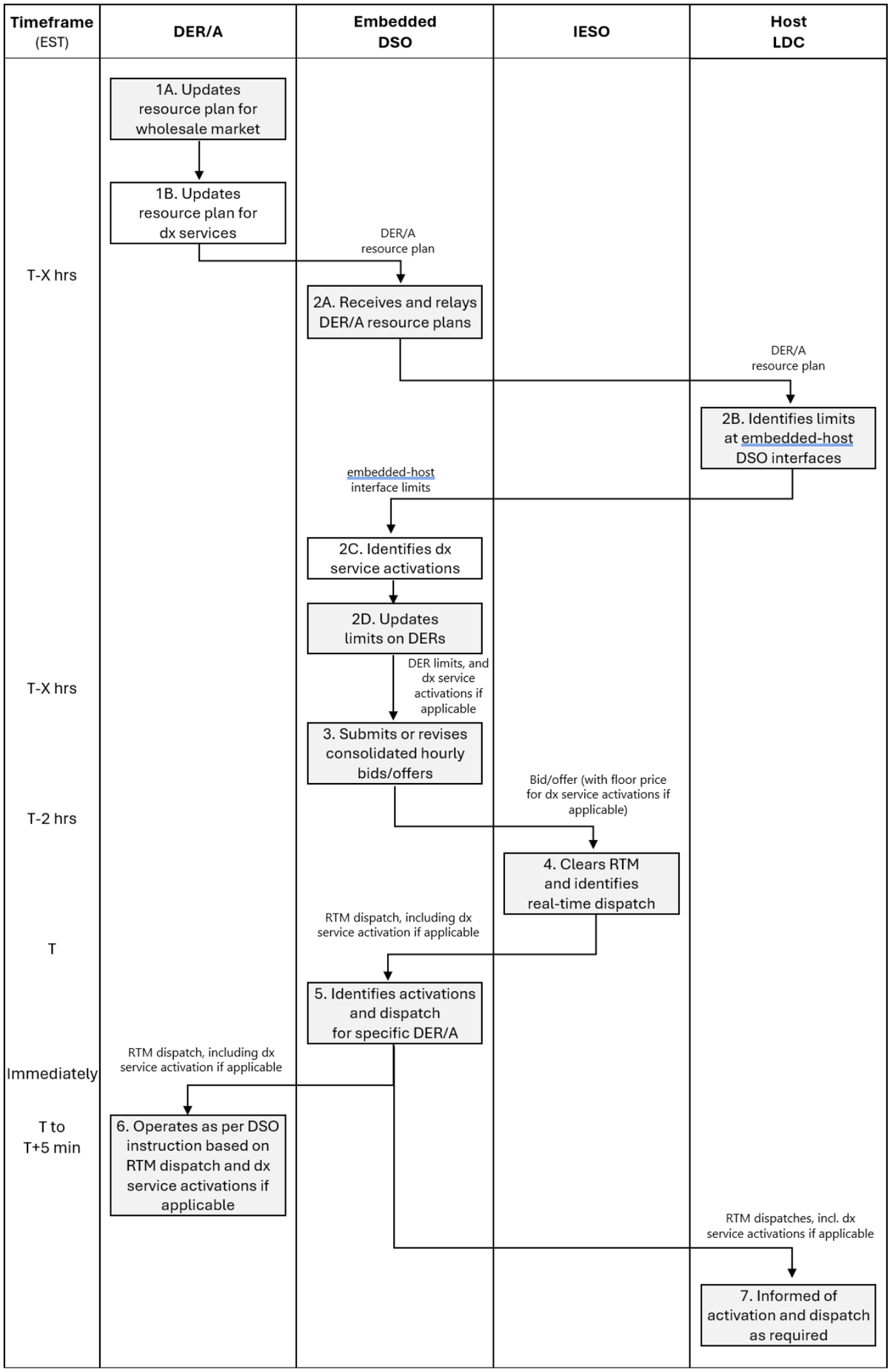

Figure 7: Protocol swim lanes for real-time process under T-DSO model in EST

C. DER/A Outage Management

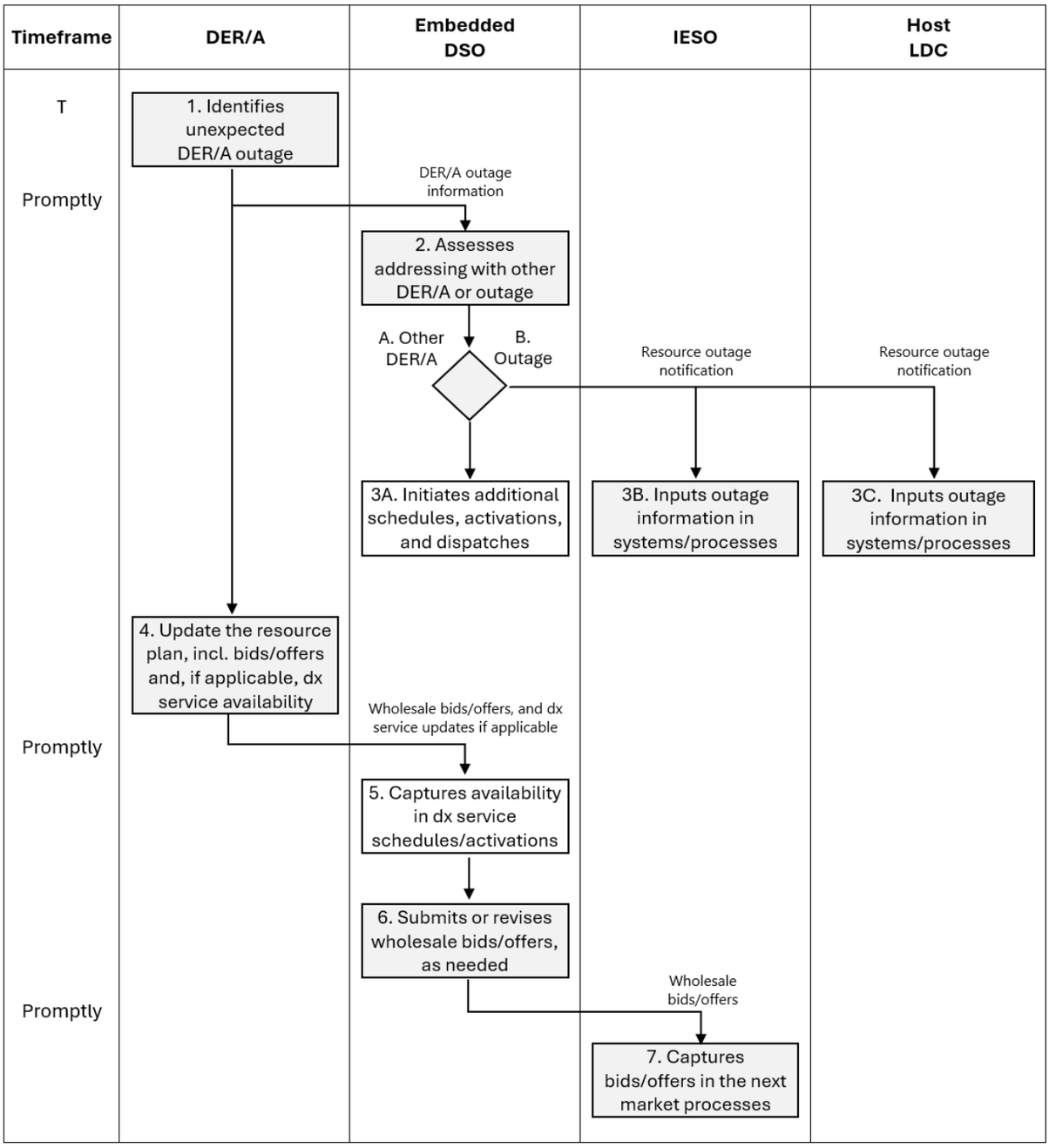

Figure 8: Protocol swim lanes for DER/A outages under T-DSO model

D. Distribution System Outage

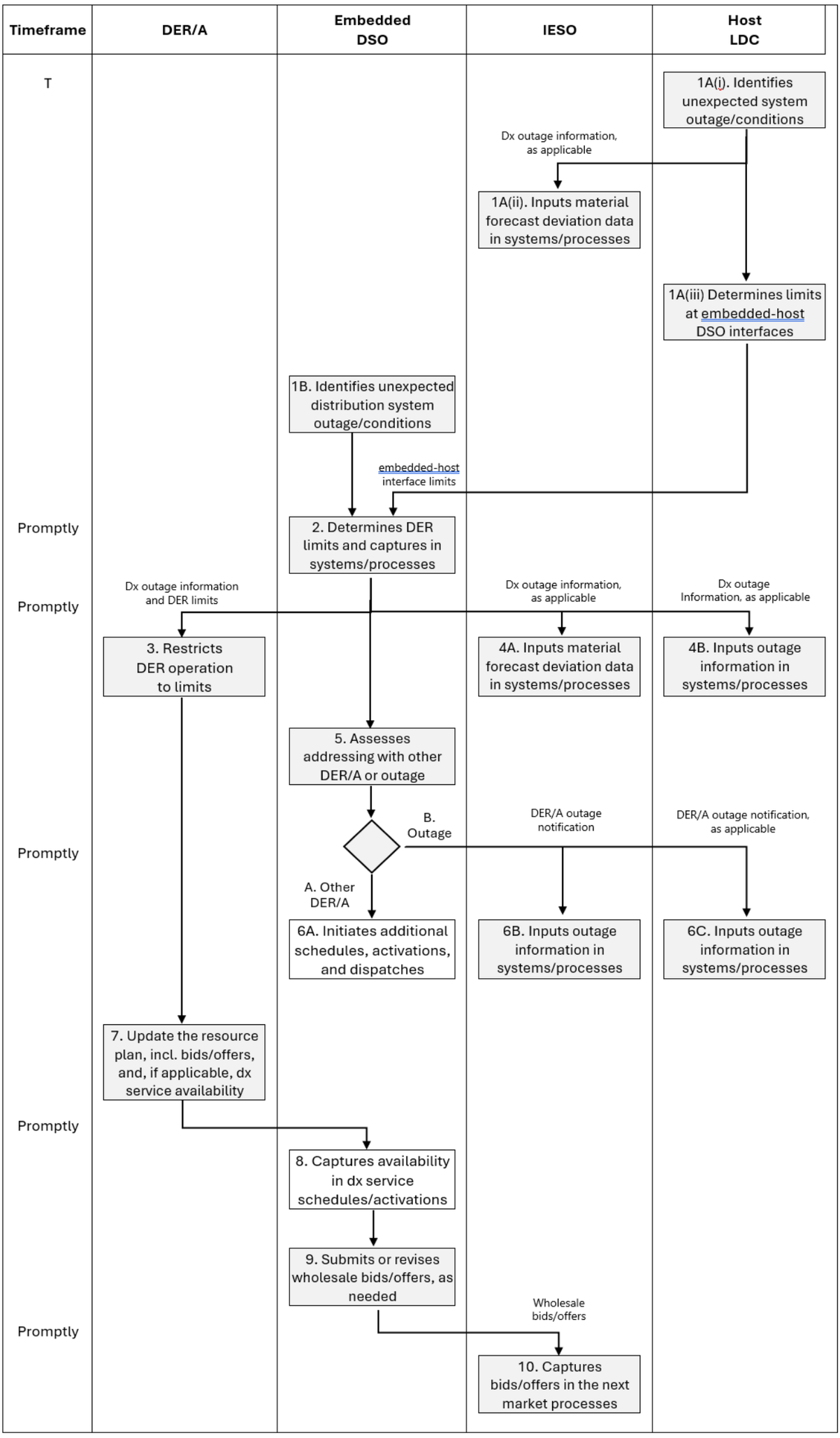

Figure 9: Protocol swim lanes for distribution system outages under T-DSO model

E. DER/A Resource Plan Change Process

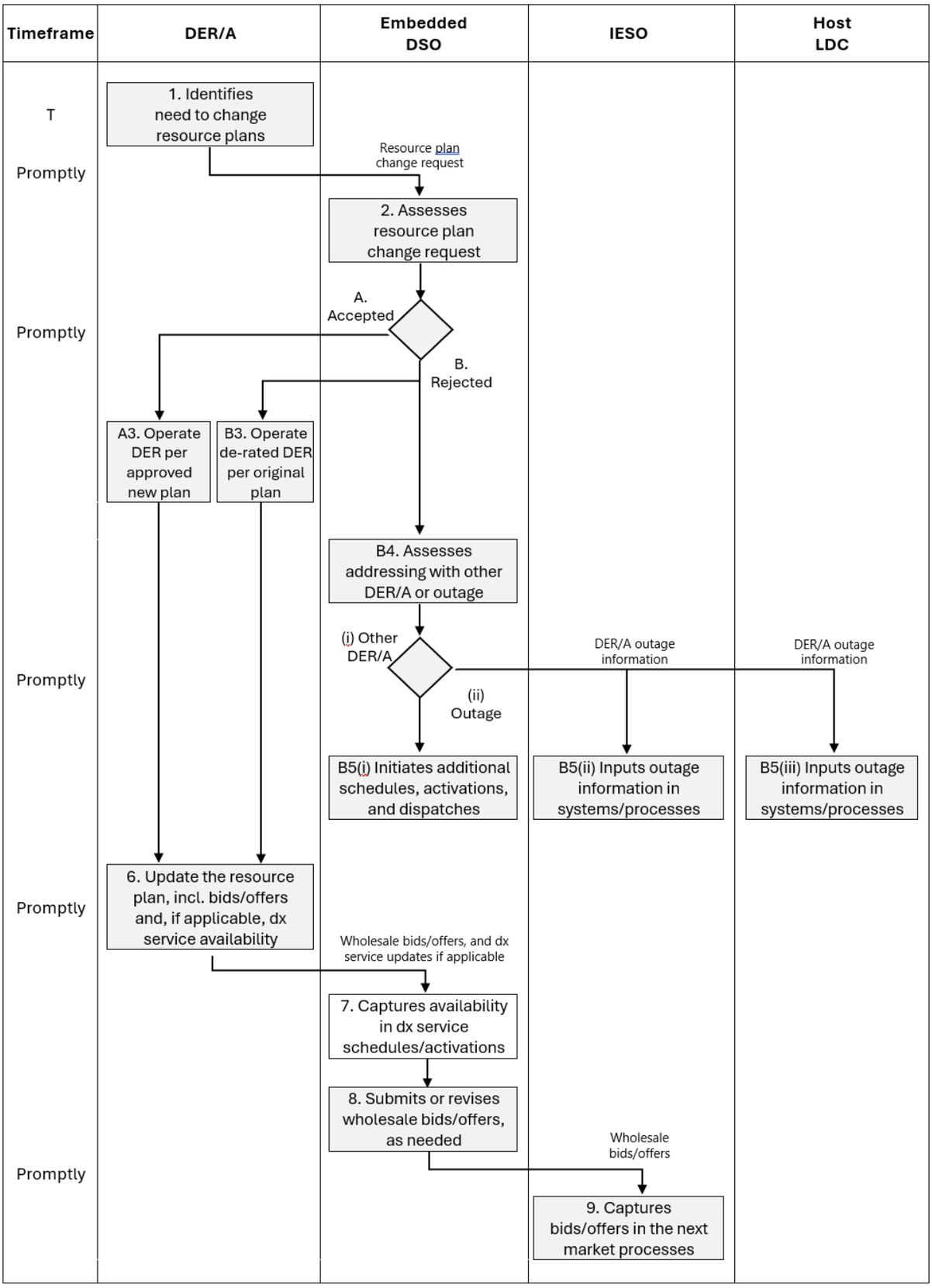

Figure 10: Protocol swim lanes for DER/A resource plan changes process under T-DSO model

4. Market Facilitator DSO

A. Day-Ahead Scheduling

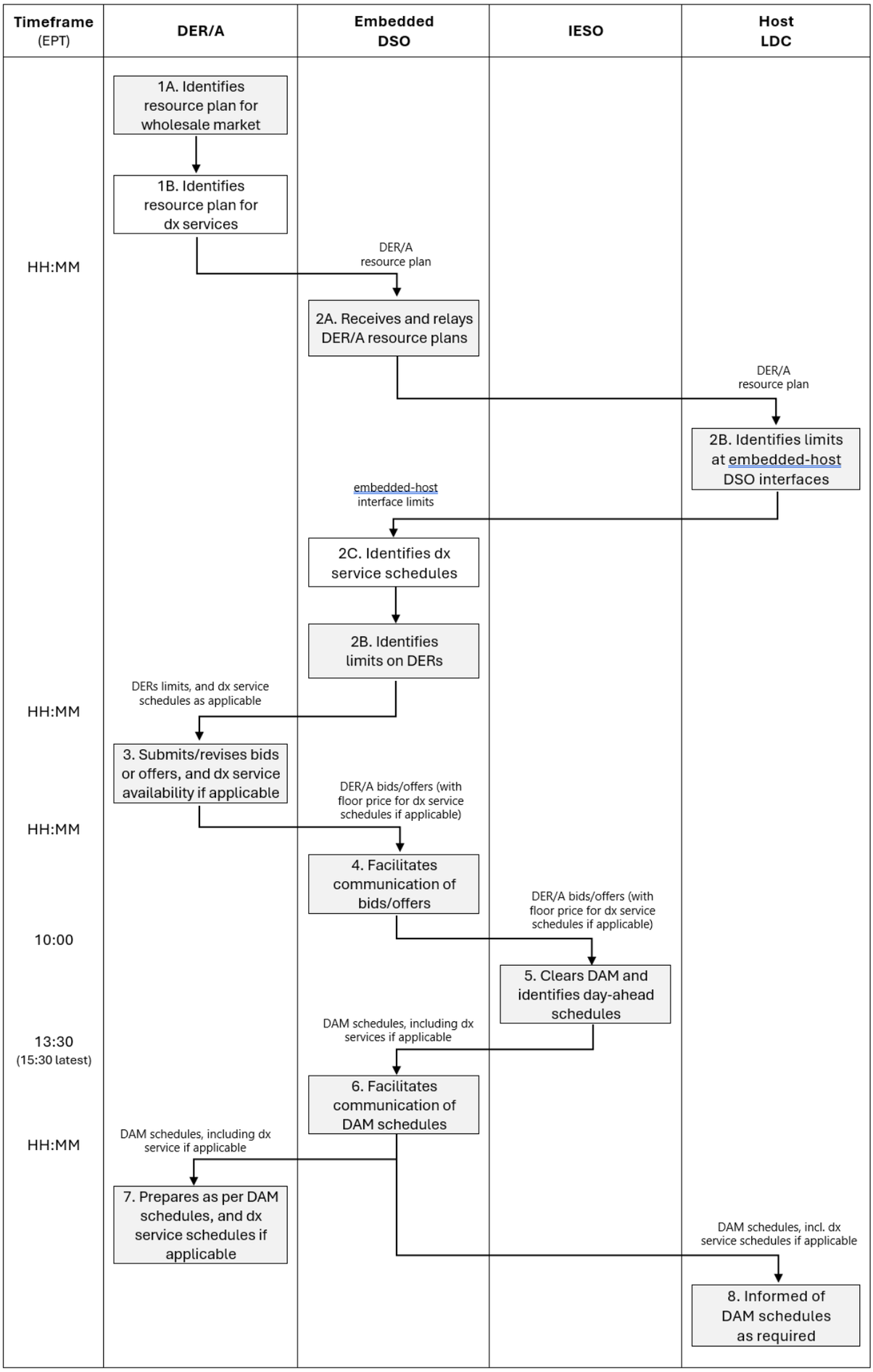

Figure 11: Protocol swim lanes for day-ahead process under MF-DSO model in EPT

B. Real-Time Activation & Dispatch

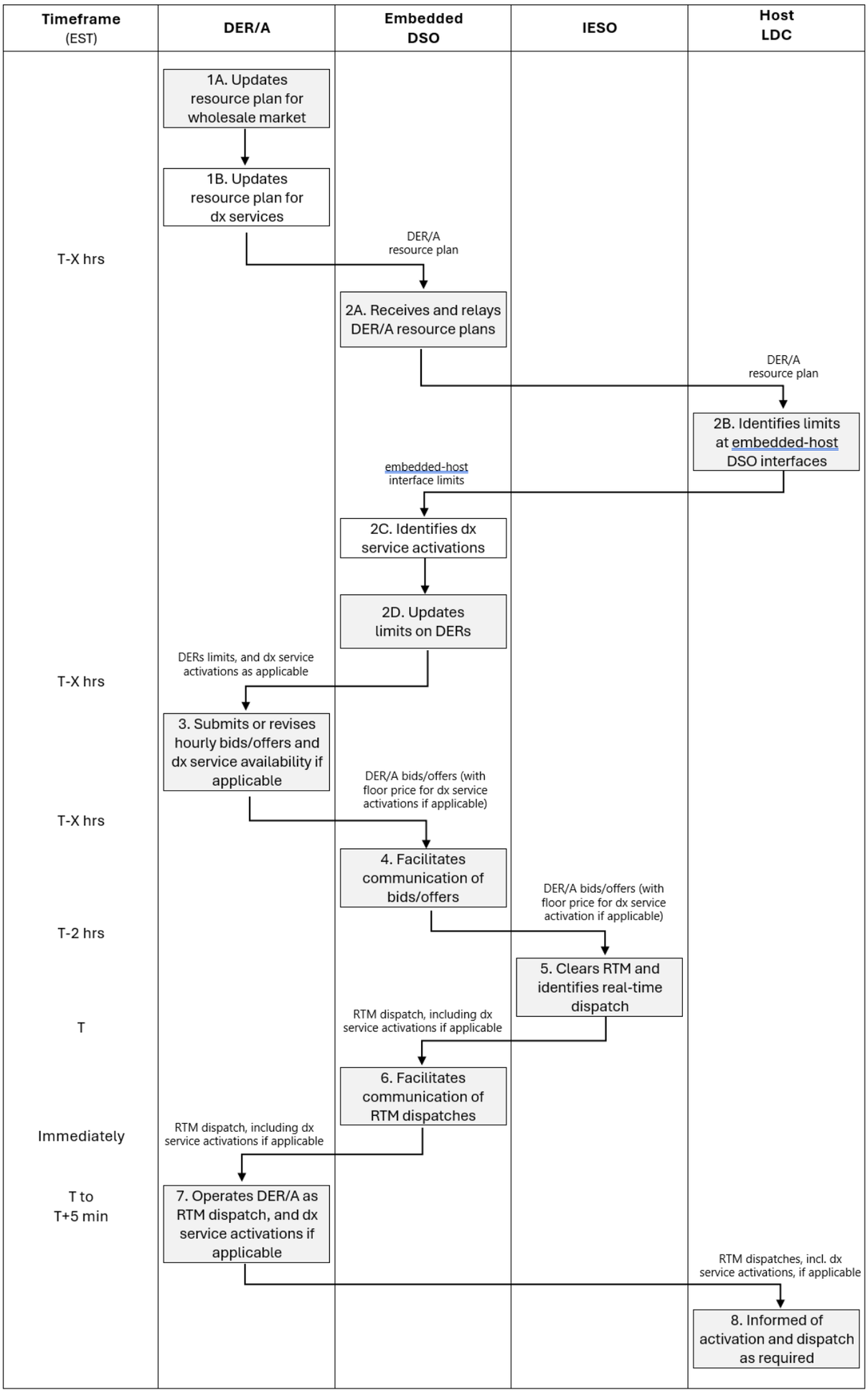

Figure 12: Protocol swim lanes for real-time process under MF-DSO model in EST

C. DER/A Outage Management

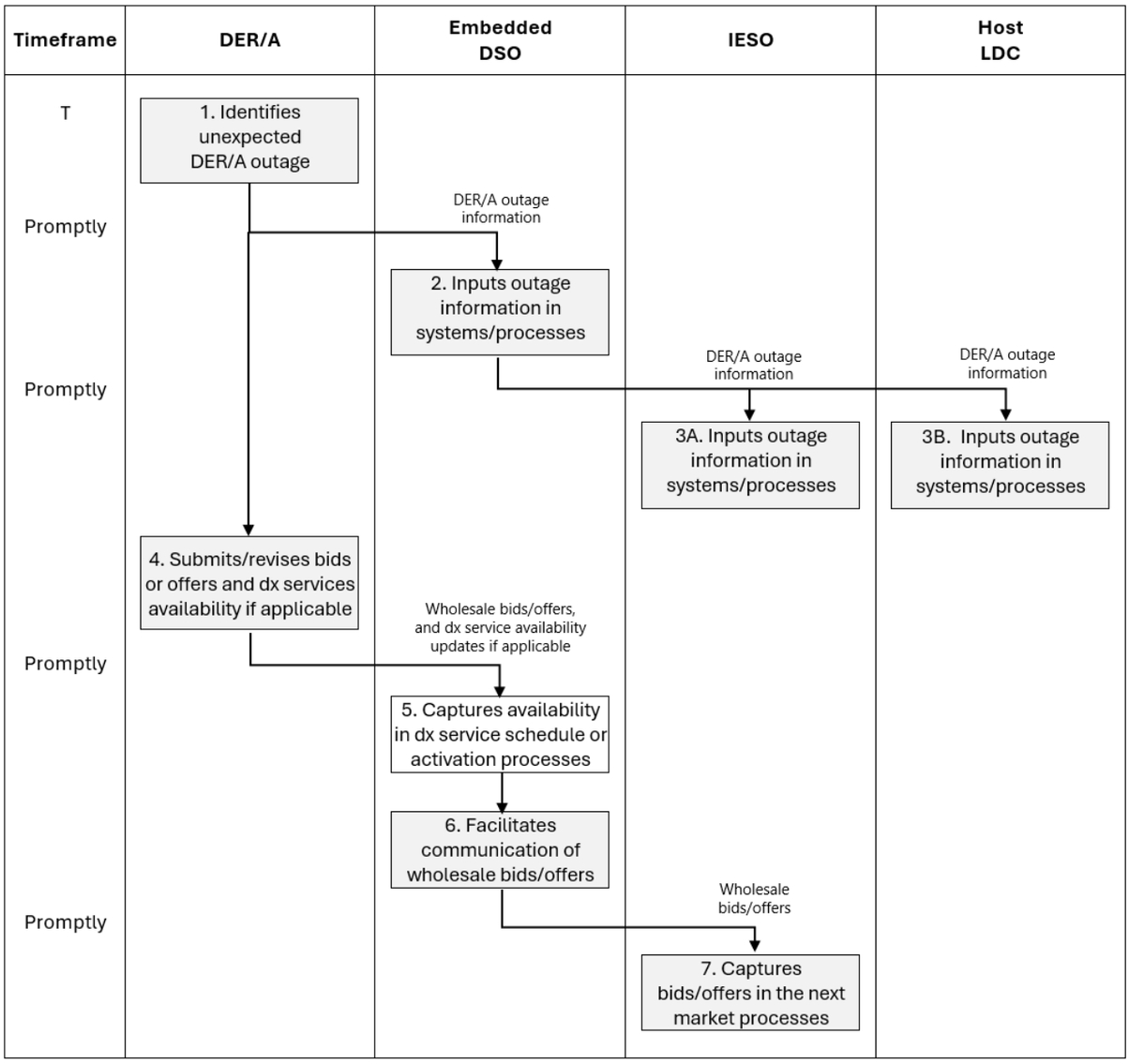

Figure 13: Protocol swim lanes for DER/A outages under MF-DSO model

D. Distribution System Override

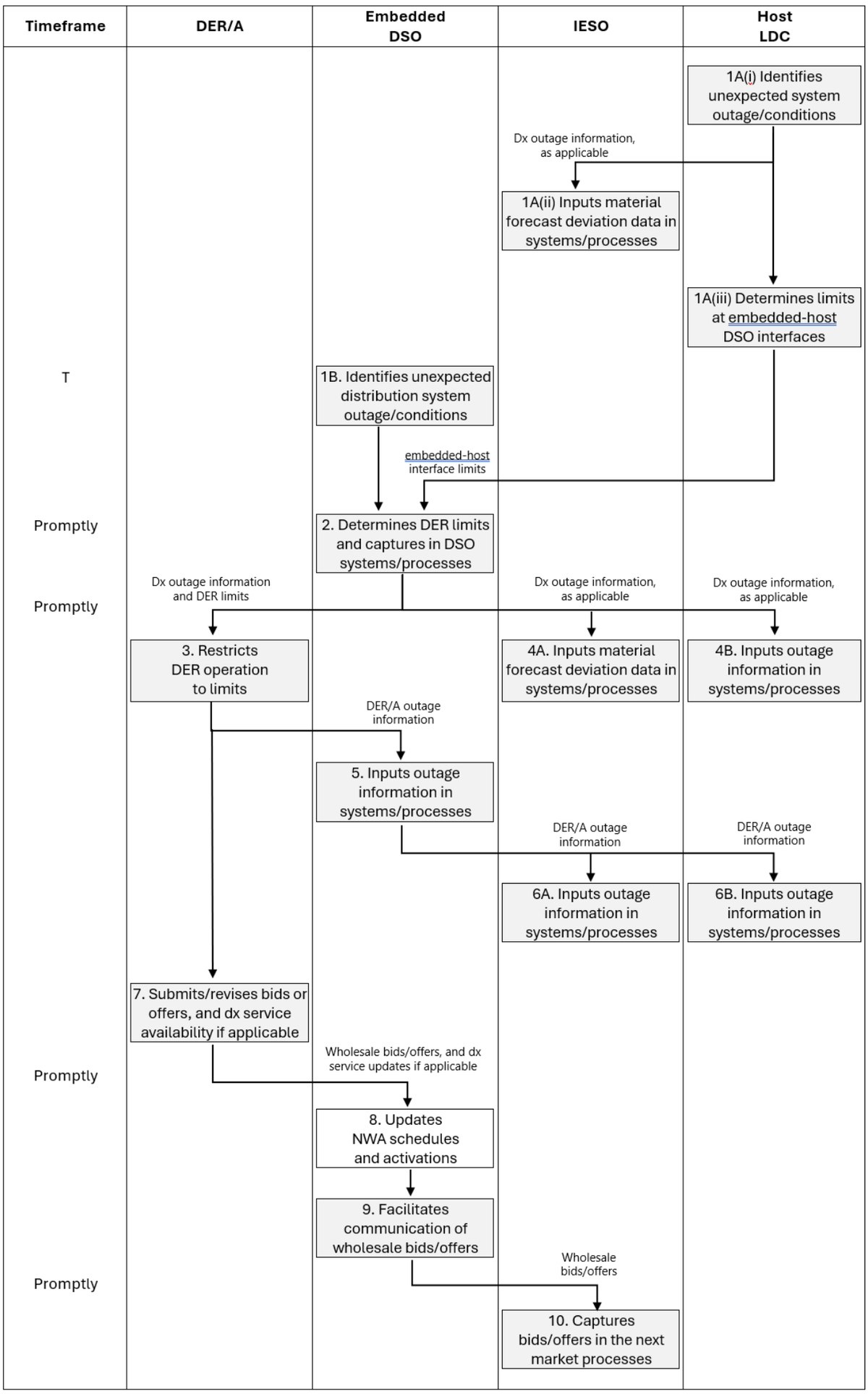

Figure 14: Protocol swim lanes for DSO overrides under MF-DSO model

E. DER/A Resource Plan Changes

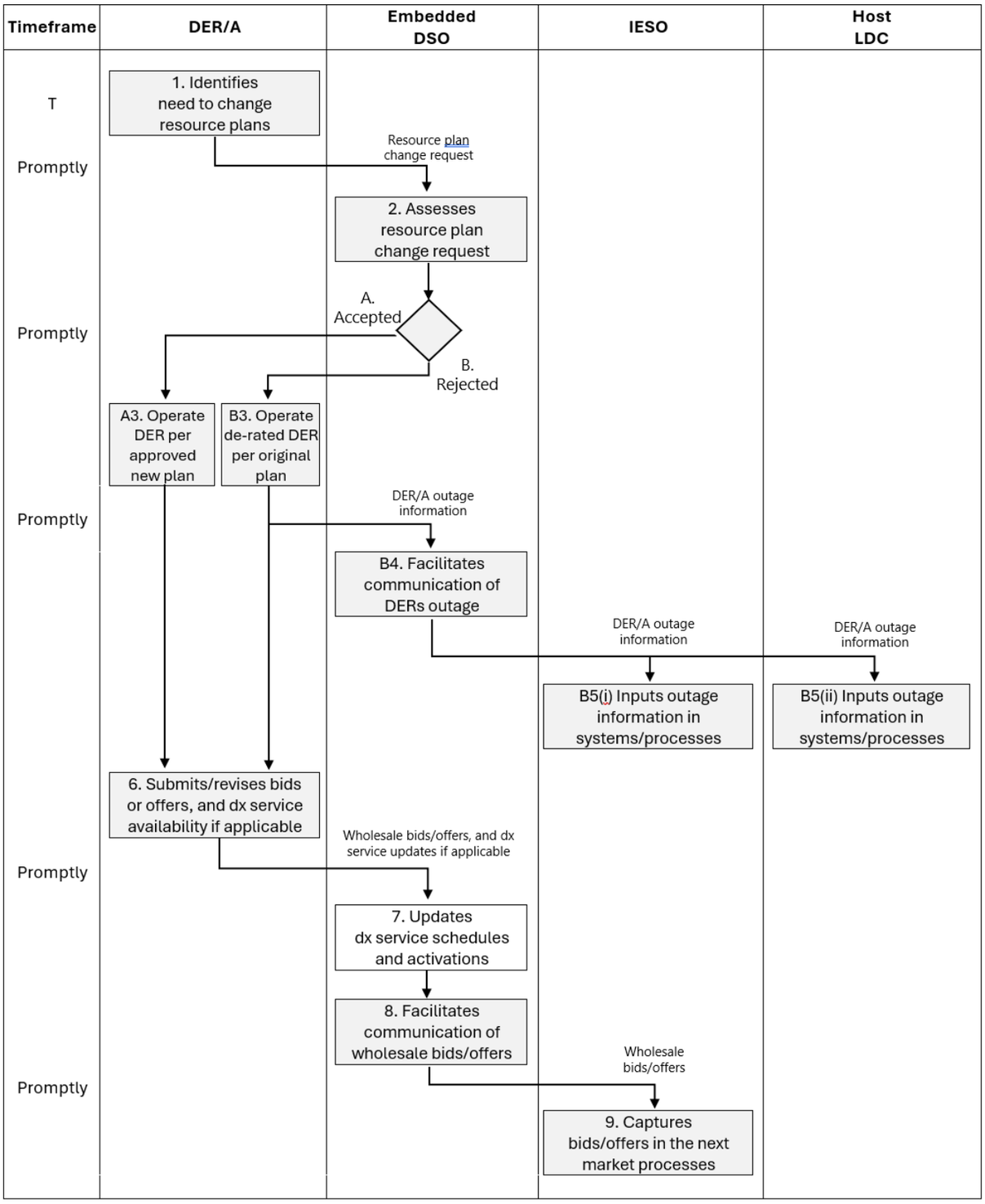

Figure 15: Protocol swim lanes for DER/A resource plan change process under MF-DSO model

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