

外部委託業者の募集

References: IO/25/CFT/10031984/JLE

“HCF D&B procurement ”

(HCF D&B の調達)

IO 締め切り 2025 年 6 月 30 日(月)

○背景

1 ITER プロジェクト、ITER 機構、F4E

ITER は、フランス南部のカダラッシュ、サン・ポール・レ・デュランスにある敷地内の建屋に、多様な最先端/ハイテクシステムを組み立て、設置する、前例のない巨大プロジェクトです。

ITER 機構 (IO) は、関連するフランスの法律および規制、認可、コード、および基本原子力施設 (INB) に適用される基準に準拠した原子力事業者です。IO は、設計の初期段階から調達、組み立て、試運転、運用までの作業を統合する責任を負っています。ITER 加盟国は、IO の予算への現金による貢献と、「国内機関」と呼ばれる法的実体を通じた現物 (建屋および/または機器) による貢献によって ITER プロジェクトに貢献しています。

新しい ITER 研究プログラム(1)と新しいベースラインは、ホットセル施設に影響を与える以下の実質的な変更をもたらしました。

- ITER 研究プログラムの段階的アプローチ：研究運転開始／重水素トリチウムフェーズ 1 (DT-1) ／重水素トリチウムフェーズ 2 (DT-2)
- ベリリウム第一壁がタングステン第一壁に置換
- ポートプラグの保守戦略の見直し
- DT-1 期間中のダイバータまたは第一壁パネルのフルセットの変更なし (上記参照)
- 線量率の低減、汚染レベルの低減

Fusion for Energy (F4E) は、EU の国内機関です。ITER プロジェクトおよび広範なアプローチ (EU-日本間の核融合に関する合意) への EURATOM の貢献を遂行する責任を負っています。ホットセル施設は IO と F4E の両方の範囲内にあります 1。F4E の範囲の実施は、F4E 加盟国の領域内に法的に設立された経済事業者 (企業等) に限定されるものとします。

HCF 契約では、IO と F4E の両方がクライアントとなる可能性があります。

2 ホットセル施設

トカマク複合施設 (下図 1 および図 2 参照) の北側に位置するホットセル施設 (HCF) は、その建屋 (ホットセルビル、HCB) とその外部プラットフォーム、プロセス、および支援システム (セクション 4.1 に記載) で構成されています。HCF は、機器の保守と放射性廃棄物の処理および貯蔵プロセスを保証します。HCF の詳細は、セクション 3.2 および 4.2.1 に記載されています。

新しい ITER 研究プログラムによって提供される機会により、DT1 および設計原則に関する HCF 要件には、以下の主要な簡素化が実施されました。

- 容器内機器の要件の削減：遠隔修理の大幅な簡素化とポートプラグ試験 (熱サイクル) の取り消し

- 手作業による操作におけるベリリウムリスクなし
- ダイバータカセットのフルセットをバッファ貯蔵する必要なし
- 第一壁パネルのフルセットを変更する必要なし
- 放射性廃棄物トリチウム除去プロセスの必要なし
- DT-1 フェーズにおける廃棄機器の数が限定的であるため、複雑な「放射性廃棄物タイプ B」（中レベル高レベル放射性廃棄物、フランス語で「MAVL Moyenne Activité Vie Longue」）プロセス/施設を設計および構築する必要なし
- HCF で実装される機能が限定的
- 放射性廃棄物在庫の削減

技術的な大幅な簡素化、コストとスケジュールの削減という目標に沿って、IO と F4E は上位要件を再定義し、プレコンセプト 2024 設計を通じてそのような設計の実現可能性を実証しました。

3 個人アクセス制御建屋

個人アクセス制御建屋（PACB）は、HCF に隣接する建屋であり、原子力建屋（HCB、TKC）へのアクセスを制御することを可能にします。2 つ目の機能は、ホットセル施設の監視のための制御室と、TKM 遠隔操作システムを収容することです。PACB の詳細は、セクション 3.3 および 4.2.2 に記載されています。

これらの機能は、HCF に適用されるのと同レベルの厳格な原子力安全要件に関連していないため、PACB に配置されています。

略語は付録 1 に記載されています。

（詳細は技術仕様書を参照下さい）

○ 目的

契約者によって納入される HCF プロジェクトの範囲は、目的に適合している必要があります。

- すべての安全および機能要件、性能基準、技術仕様および入力、適用される規則、基準、規制などに完全に準拠して設計、建設、および試運転が行われること。
- クライアントが定義した価格上限を下回ること。
- 定義されたマイルストーン内であること。
- ITER 敷地内での建設および運用上の制約があり、要求されたすべての文書で裏付けられていること。
- インターフェース（下記のセクション 4.4 参照）および契約者の供給範囲外のシステムと完全に統合されていること：HCF 内部の中央空気トリチウム除去システム、または HCF 外部の遠隔操作（RH）キャスク、RH 移送および貯蔵コンテナ、放射性廃棄物（RW）およびテストブランケットモジュール（TBM）輸出コンテナ、ITER 遠隔保守システム（IRMS）の保守および試験、タイプ A の放射性廃棄物（RW）の固化およびバッファ貯蔵、個人アクセス制御ビル、遠隔制御室など。

要求される成果物の一部は、クライアントが許認可プロセスに関連する安全ファイルを作成し、フランスの原子力規制当局に対応するための支援文書として使用されることに留意する必要があります。

ITER 施設は、フランスの規制に従い、特に INB-174 番で識別される基本原子力施設（INB「Installation Nucléaire de Base」）を構成します。そのため、契約者はここに、以下のことを通知され、またその下請業者にも通知するものとします。

- 2012 年 2 月 7 日付命令（以下「INB 命令」という）は、保護上重要なすべての機器（PIC）および保護上重要な作業（PIA）に適用される。
- INB 命令への準拠は、外部の契約者の連鎖がある場合、その連鎖内で実証されなければならない。
- 保護上重要な作業は、原子力事業者としての IO による監視の対象でもあります。

○ HCFプロジェクトの概要

1 プラントおよび建屋の主な特徴

HCF（ホットセル施設）は、トカマク（TKM）複合施設の北側に隣接して建設されるコンクリート建屋で構成されており、図1に示すように、複数のアクセスポートを通じて接続されています（図2参照）。

TKM複合施設内には貨物用リフトが設置されており、異なる階層間での部品や機器の移送が可能です。また、作業員の出入りには専用の通路が設けられています。

（詳細は技術仕様書を参照下さい）

2 HCFの主な要件と機能

HCFは、DT-1フェーズの開始時点で運用可能でなければなりません。HCFは以下のプロセス機能を提供する必要があります：

- 放射性構造物、システム、機器（SSC）の保守
- 放射性固体および液体廃棄物（ラドウェイスト）の処理および保管

これらの機能の第一レベルの内訳は以下の通りです：

保守：

- 炉内機器（IVC）の遠隔保守（洗浄を含む）および保管。IVCはトカマクの真空容器内に設置され、プラズマ運転に直接接する部品です。保守には交換や小規模な修理が含まれます。
- 炉外機器（EVE）の保守および保管。EVEは真空容器の外に設置され、汚染・活性化レベルが限定的な機器です。保守には交換や修理が含まれます。
- ITER遠隔保守システム（IRMS）の遠隔除染。これは、HCF外での保守のために輸送する前に行われます。IRMSは、炉内機器の取り外し・設置に使用される遠隔操作システムです。
- HCB内の立ち入り制限区域に恒久的に設置されたSSCの遠隔点検、清掃、保守。
- トカマクからのサンプルの特性評価や、HCF内での放射線源の追跡を目的とした遠隔照射後試験（PIE）活動およびサンプル採取。

ラドウェイスト：

- タイプA固体廃棄物（低レベル）の処理および一時保管。処理には、選別、特性評価、必要に応じた体積縮小、梱包、HCF外への搬出が含まれます。
- 液体廃棄物の処理および一時保管。水系および非水系の廃液（樹脂や濃縮物を含む）を対象とし、受け入れから排出または搬出までの全処理を行います。通常運転および事故時（例：冷却材喪失事故）

を想定。

- TFA（非常に低レベル廃棄物）の処理および一時保管。処理には、受け入れ、一時保管、予備特性評価、サイズ縮小、予備梱包、搬出が含まれます。

補足事項：

- 多くの部品、機器、廃棄物はトリチウムで汚染されています。
- 一部のタイプA廃棄物は高い活性化・汚染レベルを持ち、手作業での処理が不可能です。

これらの主機能に加え、HCFはトカマク複合施設への人員および物資のアクセス、ならびに複数の実験室へのアクセスも提供する必要があります。

ホットセル施設はINB（原子力施設）に分類されるため、建設、運用、廃止措置に関するすべての支援機能および制約（2012年2月7日付フランスINB命令に準拠）が必要です。以下はその一例です（網羅的ではありません）：

- 土木工事
- 支援システム（4.2.1節参照）
- セキュリティ機能
- 原子力安全および労働安全対策
- 法規制上の制約
- 運用機能および制約
- 制御、データアクセス、通信
- 廃止措置設計要件

プロセス機能の詳細は付録3を参照してください。

3 PACBの主な要件と機能

PACBの主な機能は以下の通りです：

- トカマク複合施設（TKC：建屋11および14）およびHCBへの人員アクセス拠点の提供と、初期アクセス制御の実施
- トカマクおよびホットセルの遠隔操作、ラドウェイスト処理、手作業作業の監視・制御・モニタリングのための制御室の設置
- PACB、HCB、TKCに勤務する職員のための福利厚生施設の提供

建屋24（PACB）は、トカマク複合施設（建屋11および14）およびホットセル建屋（B21）への安全かつ規制されたアクセスを確保するために計画された施設です。PACBは放射線管理および衛生管理の中核を担いますが、非原子力施設として分類される予定です。

PACBは、統合試運転（IC）フェーズから研究運転開始（SRO）フェーズにかけて、トカマク複合施設への唯一の人員出入口として機能する予定です。

PACBの設計には、不正侵入防止、外部脅威からの保護、作業員の放射線防護および汚染管理を確保するための堅牢なアクセス制御が組み込まれます。これらの機能は、REMSラボ、リアルタイムモニタリングシステム、制御アクセスバリア室によって支えられます。

PACB内の出入り動線には、全身モニター装置の設置が含まれます。また、遠隔操作作業（トカマクおよびホットセル）や手作業作業の監視・制御のための制御室も設置されます。

さらに、建屋11、14、21およびPACBで勤務する職員を支援するため、更衣室、除染シャワー、衛生設備などの福利厚生施設も備えられます。これにより、放射線管理区域への出入り時に適切な除染手順が確実に実施されます。

PACBには、汚染モニタリングシステム、洗浄物処理エリア、廃水管理インフラも組み込まれる予定です。除染プロセスからの廃水は、工業排水ネットワークへの放流が可能であることが証明されない限り、サンプリングのために貯留タンクに収集されます。汚染水は場外で処理され、清浄水は敷地内の衛生排水システムに放流されます。

放射線安全基準に準拠するため、建屋ごとの通行の一意性とアクセスの分離が求められます。

PACB施設の規模の目安は以下の通りです：

- 建屋11および14にアクセスする職員：約190名
- 建屋21に入る職員：約50名
- 遠隔操作制御室（RHCR）で作業するオペレーター：50名未満

3.4 ステークホルダーおよびその他の関係会社

本プロジェクトでは、設計・建設一括方式（Design & Build）が採用されています。請負業者（HCFの設計・建設担当）は、契約上のクライアント以外にも、HCF契約やITERプロジェクト全体に関連する活動を担当する他のステークホルダーと連携する可能性があります。関係する可能性のあるステークホ

○契約者の業務範囲

1 HCF プロジェクトの範囲

HCF プロジェクトには、ホットセル施設（HCF）のプロセス、建屋、支援システム、および外部プラットフォームの提供が含まれます。これには、最初の設計段階（調達プロセスの一部である競争的対話中に提供）、詳細設計段階、認証、建設段階から試験および試運転段階までのすべてのフェーズが含まれます。各フェーズの詳細は 4.6 節に記載されており、3.2 節で説明されている機能的ニーズに対応する必要があります。

HCF プロジェクトには PACB の設計も含まれており、PACB の建設はオプションとなる可能性があります。この範囲は調達プロセス中に確定されます。

契約者は、定義された範囲と関連する外部境界までを含む、統合された運用可能な施設（原子力安全を含む。付録 4 参照）を提供しなければなりません。

2 契約者の範囲

この調達における契約者の高レベルでの範囲と境界は以下の通りです：

2.1 HCF に関して

- プロセス：
 - 遠隔操作による保守：
 - 炉内機器の保守
 - IRMS：除染プロセス
 - 炉外機器保守の統合

- 放射性廃棄物管理：
 - タイプ A 固体廃棄物：処理および一時保管
 - 液体廃棄物の処理および保管
 - TFA：大型機器の受け入れ、特性評価、一時保管およびサイズ縮小のみ
- 建屋および関連する外部プラットフォームと機械システム：
 - ホットセル建屋（HCB）およびその外部プラットフォームの土木工事
 - 地盤工学と基礎：現地調査、掘削作業、基礎設計、地盤改良措置
 - 敷地整備：整地、土工、排水およびユーティリティ統合
 - 構造物：鉄筋コンクリート、鉄骨構造、埋設物、ステンレス鋼ライナーの可能性
 - 金属工事：鉄骨およびプラットフォーム
 - 接地および雷保護
 - 仕上げ：除染および防塵塗装
 - 機械設備：ドア、搬送・吊り上げ装置
 - HCB と TKM 間の橋梁
 - 敷地統合
 - 建屋 14 の南東にあるゾーン 7W と HCF の間に位置する既存の HCC 仮設保持壁の長期的な持続可能構造（付録 6 の図参照）
- HCF 支援システム：
 - 原子力用空調（HVAC）および局所冷却装置（LAC）システム、排水システム、火災検知・消火システム
 - 空気トリチウム除去システム（ADS）：HCF 内の ADS ネットワーク配管
 - 液体・気体（LGAS）：HCF 内のネットワーク配管
 - 電源供給および電力配分：HCF 内の電力供給と配電、負荷センターを含み、他の ITER 建屋とのインターフェースを含む
 - 冷却水システム（CHWS）：SIC および非 SIC
 - ケーブルトレイ：建屋および技術ギャラリー内のすべてのシステムのケーブル配線、引き込み、終端処理を含む
 - 計装および制御（I&C）：契約者が提供するすべてのシステムに対して
 - CODAC、中央インターロックシステム、中央安全システム：すべてのシステムの計装および制御システム。共通ネットワークアーキテクチャの統合および CODAC、中央インターロック、安全システム、ITER サイト建屋とのインターフェースを含む
 - アクセス制御：ドア、カメラ、センサー、セキュリティアクセスを含み、ITER のセキュリティ要件との主要なインターフェース
 - 放射線および環境モニタリングシステム（REMS）

（以下詳細は技術仕様書を参照下さい）

○入札プロセスの概略日程

概略日程は以下の通りです：

| プロセス | 暫定日程 |
|-------------|------------------|
| 外部委託の通知 | 2025 年 5 月 |
| 外部委託の締め切り | 2025 年 6 月 30 日 |
| 事前審査の発行 | 2025 年 7 月 30 日 |
| 事前審査の受領 | 2025 年 10 月 16 日 |
| 競争的対話方式の通知 | 2025 年 12 月 15 日 |
| 最善な、最後の提案提出 | 2027 年 6 月 16 日 |
| 契約授与予定日 | 2027 年 10 月 27 日 |

【※ 詳しくは添付の英語版技術仕様書「**Technical Summary - HCF D&B procurement**」をご参照ください。】

ITER 公式ウェブ <http://www.iter.org/org/team/adm/proc/overview> からアクセスが可能です。

「核融合エネルギー研究開発部門」の HP：<http://www.fusion.qst.go.jp/ITER/index.html>
では ITER 機構からの各募集（IO 職員募集、IO 外部委託、IO エキスパート募集）を逐次更新しています。ぜひご確認ください。

イーター国際核融合エネルギー機構からの外部委託 に関心ある企業及び研究機関の募集について

＜ITER 機構から参加極へのレター＞

以下に、外部委託の概要と要求事項が示されています。参加極には、提案された業務に要求される能力を有し、入札すべきと考える企業及び研究機関の連絡先の情報を ITER 機構へ伝えることが求められています。このため、本研究・業務に関心を持たれる企業及び研究機関におかれましては、応募書類の提出要領にしたがって連絡先情報をご提出下さい。

Technical Specifications (In-Cash Procurement)

Technical Summary - HCF D&B procurement

This document is the technical summary for the HCF D&B procurement, for the Call for Nomination step.

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1 Background

1.1 ITER PROJECT, ITER ORGANIZATION and F4E

ITER is a first of a kind mega-project with a wide range of disparate leading edge/high-tech systems to be assembled and installed into buildings at its site in Saint Paul lez Durance, Cadarache, in the south of France.

The ITER Organization (IO) is the nuclear operator, complying with the relevant French Laws and regulations, authorization, codes and standards applicable to Basic Nuclear Installation (INB). IO is responsible for integrating the activities from the early stage of design to the procurement, the assembly, commissioning and operation. The ITER Members contribute to the ITER Project with contributions in cash to the budget of the IO and with contribution in kind (buildings and/or equipment) through legal entities called “Domestic Agencies”.

The new ITER Research Program (1) and the new Baseline led to the following substantial changes that are impacting the Hot Cell Facility:

- Staged approach of the ITER Research Program: Start of Research Operation / Deuterium Tritium phase 1 (DT-1) / Deuterium Tritium phase 2 (DT-2)
- Beryllium First Wall replaced by Tungsten First Wall
- Revision of maintenance strategy of Port Plugs
- No change of full set Divertors or First Wall Panels during DT-1 (see above)
- Reduced dose rates, reduced contamination levels

Fusion for Energy (F4E) is the EU’s Domestic Agency. It is responsible for delivering Euratom’s contribution to the ITER project and the Broader Approach (EU-Japan agreement on fusion).

Hot Cell Facility is within the scope of both the IO and F4E¹. Execution of the F4E scope shall be limited to the economic operators that are legally established in the territory of an F4E Member.

Both the IO and F4E may be the Client under the HCF contract.

1.2 Hot Cell Facility

The Hot Cell Facility (HCF), located on the north side of the Tokamak complex (see Figure 1 and Figure 2 below), is composed of its building (Hot Cell Building, HCB) along with its external platform, the processes and the supporting systems (described in section 4.1). The HCF ensures the maintenance of components as well as the radwaste treatment and storage processes. The HCF is described in more details in sections 3.2 and 4.2.1.

Thanks to the opportunities provided by the new ITER Research Program, the following main simplifications have been implemented on HCF requirements for DT1 and design principles:

- Reduced requirements for In-Vessel-Components: Drastic simplification of remote repair and cancellation of the Port Plugs test (thermal cycling)

¹ The F4E scope and the ITER scope are described in section 4.2 of this Call for Nomination.

- No Beryllium risk for hands-on operations
- No need to buffer store a full set of Divertor Cassettes
- No need to change a full set of First Wall Panels
- No need of Radwaste detritiation process
- Limited number of discarded components during DT-1 phase, hence no need to design and build a complex “Radwaste Type B” (*Medium Activity Long Lived Radwaste*, “MAVL Moyenne Activité Vie Longue” in French) process / facility
- Limited functions implemented in the HCF
- Reduced Radwaste inventory

In line with an objective of great technical simplification, reduction of cost and schedule, the IO and F4E have redefined high level requirements and demonstrated the feasibility of such design through the pre-concept 2024 design.

1.3 Personal Access Control building

The Personal Access Control Building (PACB) is a building next to the HCF, enabling the control access to the nuclear buildings (HCB, TKC). The second function is to house the control rooms for the supervision of the Hot Cell Facility, together with the TKM remote Handling Systems. The PACB is described in more details in sections 3.3 and 4.2.2.

These functions are located in PACB because they are not associated to the same level of stringent nuclear safety requirements that apply to the HCF.

Abbreviations are given in Appendix 1.

2 Purpose

The HCF Project scope delivered by the Contractor shall be fit for purpose:

- Designed, built and commissioned in full compliance with all safety and functional requirements, performance criteria, technical specifications and inputs, applicable rules, standards and regulations, etc.
- Below a price cap defined by the Client,
- Within the defined milestones
- With construction and operation constraints on ITER site and substantiated with all the requested documentation
- Fully integrated at Interfaces (see section 4.4 below) and with systems outside Contractor scope of supply: either inside the HCF with the central Air detritiation system, or outside the HCF with the Remote Handling (RH) cask, RH transfer and storage containers, radwaste (RW) and Test Blanket Module (TBM) export containers, maintenance and test of Iter Remote Maintenance System (IRMS), cementation and buffer storage of Radwaste (RW) type A, personnel access control building, remote control room, etc.

It must be noted that part of the requested deliverables shall be used as support documentation for the Client to establish safety files associated with the licensing process and to answer to the French nuclear regulator. The ITER facilities constitute a Basic Nuclear Installation (INB “Installation Nucléaire de Base”) according to French regulation, specifically identified with the number-INB-174. As such, the Contractor is hereby informed, and shall inform its subcontractors that:

- The Order 7th February 2012 (hereinafter referred to as the INB Order) applies to all the components important for the protection (PIC) and the activities important for the protection (PIA),
- The compliance with the INB-Order must be demonstrated in the chain of external contractors, if any,
- The Protection Important Activities are also subject to a surveillance done by the IO as Nuclear Operator.

3 HCF Project overview

3.1 Main features of plant and building

The HCF is made of a concrete building, located adjacent to the Tokamak (TKM) Complex, north side (see Figure 1) from which it is connected through a number of access ports as shown in Figure 2.

A cargo lift is located in the TKM Complex for the transfer of components and equipment between different floor levels, while personnel access corridors are allowing the entrance of operators.

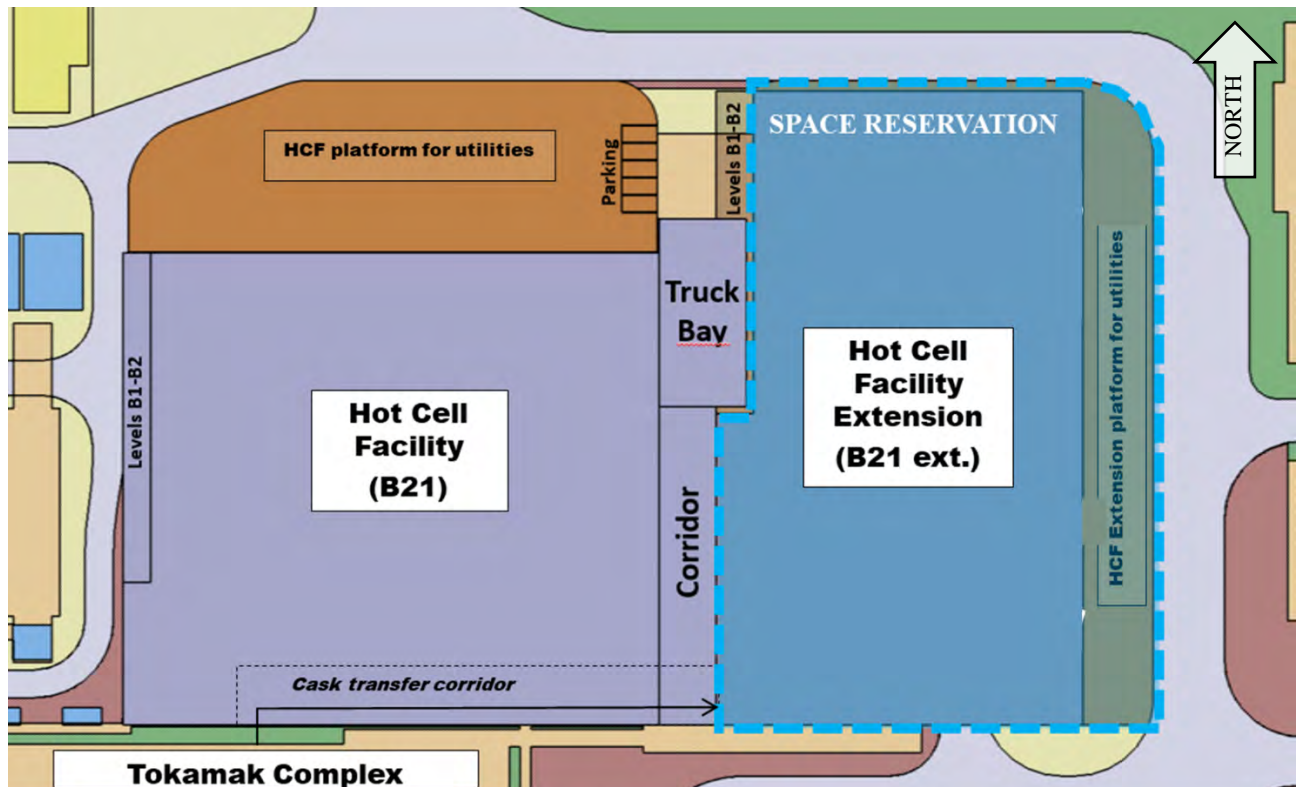


Figure 1: Staged construction of the Hot Cell Facility

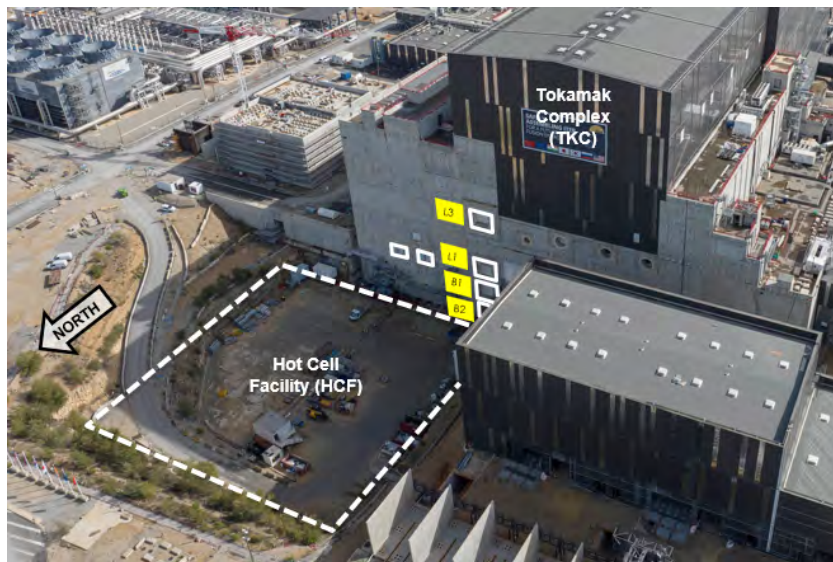


Figure 2: HCB layout area, Site interfaces and constraints

The Hot Cell Facility Extension (HCF ext.), corresponding to B21 ext., is a separate building out of scope of the HCF contract. However, a space reservation is allocated for the next ITER research plan phases for which major interfaces are connected with the HCF.

To be noted that the construction of the HCF could occur at the same time as the construction of the adjacent buildings as well as operation activities (e.g. SRO). This strong constraint shall be considered at an early stage of design, in term of technical feasibility, cost, functional and physical interfaces and coactivity of the work on site (e.g.: HCF construction could occur in a congested/constrained area).

An indicative illustration of the HCF preconcept 2024 is provided in appendix 5.

3.2 Main requirements and functions of the HCF

The HCF shall be ready at start of DT-1 phase. The HCF shall provide the following process functions:

- **Maintenance** of radioactive structures, systems and components (SSC)
- Treatment and storage of **radioactive solid and liquid waste** (radwaste)

The first level of breakdown of these functions covers:

- **Maintenance:**
 - The remote **maintenance** (including cleaning) and **storage** of activated and contaminated **In-Vessel-Components (IVC)**. The IVC are the components located inside the Vacuum Vessel of the Tokamak, facing plasma operations. Maintenance of these components includes replacement or small repair of the component.
 - The **maintenance** and **storage** of **Ex-Vessel-Equipment (EVE)**. The EVE corresponds to equipment located outside the Vacuum Vessel for which the levels of contamination and activation is limited. Maintenance of these equipment includes replacement or repair of the equipment.
 - The remote **decontamination of ITER Remote Maintenance Systems (IRMS)** before their export for maintenance outside the HCF. IRMS covers the remote

handling systems used to remove (and install) in-vessel-components from/to the vacuum vessel.

- Remote **inspection, cleaning, and maintenance** of Systems Structures and Components (SSC) permanently located (captive) within areas of the HCB where personnel access is highly restricted or forbidden.
- Remote **Post Irradiation Examination (PIE)** activities / sample collection to characterise samples coming from the Tokamak and track the source term in the HCF associated with the components received/exported.
- **Radwaste:**
 - Treatment and buffer storage of **Type A solid radwaste (RW)**. Type A RW corresponds to low-level waste. Treatment covers sorting, characterization, small volume reduction if necessary, packaging and export outside the HCF
 - Treatment and buffer storage of **liquid radwaste**. The liquid RW includes aqueous and non-aqueous effluents as resins (and possible concentrates). The HCF requires to perform the complete treatment from reception to discharge or export of the liquid RW covering normal operations and accidental scenarios (e.g.: Loss of Coolant Accident (LOCA))
 - Treatment and buffer storage of **TFA RW**. TFA corresponds to very-low-level waste. Limited treatment of TFA RW covers reception, buffer storage, pre-characterization, possible size reduction, pre-packaging and export out of the HCF.

To be noted that:

- many components, equipment and radwaste are contaminated with tritium
- some Type A radwaste have a high level of activation and contamination forbidding hands-on treatment

Alongside of these two main functions, the HCF needs to provide personnel and material access to the Tokamak Complex as well as several laboratories.

The Hot Cell Facility is an INB meaning that all supporting functions and constraints to build, operate and decommission an INB is required (following the French INB Order 7th of February 2012). The following list provides examples of these supporting functions and constraints – *list non-exhaustive*:

- Civil works
- Supporting systems (described in section 4.2.1)
- Security features
- Nuclear safety & occupational safety provisions and features
- Regulations constraints and boundaries
- Operational functions and constraints
- Control, data access and communication
- Decommissioning design requirements

Further details regarding the process functions are provided in appendix 3.

3.3 Main requirements and functions of the PACB

The main PACB functions are:

- To provide an access point personnel to Tokamak Complex (TKC, i.e. Building 11 and Building 14) and HCB and manage all first access control steps,
- To accommodate the control rooms for the supervision, control and monitoring of the remote handling (both Tokamak and Hot Cell Remote Handling operations), radwaste activities and hands-on activities to be performed in the Tokamak Complex and the Hot Cell Building,
- To provide the welfare facilities for the personnel present in PACB, HCB and TKC.

Building 24 (PACB) is a facility planned to ensure the **safe, secure, and regulated access of personnel to the Tokamak Complex (Buildings 11 and 14) and the Hot Cell Building (B21)**. Whereas the PACB would carry out key roles in radiological access control and hygiene, it shall be intended to be classified as a non-nuclear building.

The PACB is intended to serve as the sole personnel entry point to the Tokamak Complex starting from the Integrated Commissioning (IC) phase and continuing into the Start of Research Operations (SRO) phase.

The PACB design shall incorporate robust access control measures to prevent unauthorized entry, safeguard against external threats, and ensure personnel radiation protection and contamination control. These functions shall be supported by the REMS laboratory, real-time monitoring systems, and controlled-access barrier rooms.

The flow of access and exit within the PACB includes the capacity of full body monitor devices.

In addition to managing access, the PACB would house **control rooms** for the supervision, control, and monitoring of operations involving remote handling (both Tokamak and Hot Cell Remote Handling operations) and hands-on tasks conducted within the Tokamak and Hot Cell facilities.

Furthermore, the building would be equipped with **personnel welfare facilities**, including changing rooms, decontamination showers, and sanitary accommodations, to support staff working in Buildings 11, 14, 21, and the PACB itself. These spaces would ensure that all personnel follow appropriate decontamination protocols before entering or exiting radiologically controlled areas.

The PACB is also planned to incorporate contamination monitoring systems, laundry handling areas, and wastewater management infrastructure. Wastewater from decontamination processes would be collected in holding tanks for sampling if it cannot be demonstrated that they can be released in the site industrial drainage network. Contaminated water would be transferred for off-site treatment, while clean water would be discharged to the site's sanitary drainage system.

To comply with radiological safety standards, the building shall enforce unicity of passage and segregation of access by building.

As an order of magnitude, the PACB facility involves the following features:

- Approximately 190 staff accessing Buildings 11 and 14,
- Approximately 50 staff entering Building 21,
- Expected < 50 operators working in the Remote Handling Control Room (RHCR).

3.4 Stakeholders and other companies

A Design & Build approach has been chosen as the preferred option for the delivery of the scope.

Beyond the contractual link with the client, the Contractor (for HCF design and build) may be in interaction with other stakeholders in charge of activities in relation with the HCF contract and more widely with the ITER Project. Among the potential stakeholders in interface with the Contractor, there may be contractors in charge of (the following list is not exhaustive):

- Audit
- Occupational health and safety
- Legal inspection
- Any expertise required by the client
- Client's Insurances
- Etc.

Please see also Appendix 2 for conflict-of-interest principles.

4 Contractor's Scope of Work

4.1 HCF Project scope

The HCF Project includes the delivery of the processes, building, Supporting Systems and external platform for the Hot Cell Facility. It includes all phases from First Design phase (delivered during Competitive Dialogue, part of the procurement process), the Detailed Design phase, as well as qualification, the Construction phase up to test and commissioning phase. Each phase is described in section 4.6 and shall cope with the functional needs described in section 3.2.

The HCF Project includes also the design of the PACB, the construction of the PACB will likely be an option, this scope will be confirmed during the procurement process.

The Contractor shall deliver an integrated and operational facility, including nuclear safety (see appendix 4) up to its defined scope boundaries and associated external boundaries interfaces. Figure 3 provides a schematic overview of the HCF Contractor scope.

The procurement procedure is presented in section 6.

4.2 Contractor scope

More specifically, the Contractor's scope and boundaries at high-level for this procurement are:

4.2.1 *For HCF*

- **Processes:**
 - Remote handling maintenance:
 - In-Vessel-Components maintenance
 - IRMS: decontamination processes
 - Integration of Ex-Vessel-Equipment maintenance
 - Radwaste management
 - Type A solid RW: treatment and buffer storage
 - Liquid RW treatment and storage
 - TFA: only reception, characterization, buffer storage and size reduction for large components
- **Building and its associated external platform and mechanical systems:**
 - Hot Cell Building (HCB) and its external platform civil works
 - Geotechnics and foundations: site-specific studies, excavation works, foundation design, soil improvement measures based on geotechnical assessments
 - Site preparation: site clearance, earthworks, drainage and utilities integration
 - Structures: Reinforced concrete, steel structures, embedded items potential stainless-steel liner
 - Metal works: steel works and platforms
 - Earthing and lightning protection
 - Finishing: decontaminated and anti-dust paint

- Mechanical building systems: doors, handling and lifting means
- Bridges between HCB and TKM
- Site integration
- Long-term sustainable structure for the existing HCC temporary retention wall located between the Zone 7W (South-East of Building 14) and the HCF (see figures in Appendix 6)
- **HCF Supporting Systems:**
 - Nuclear HVAC systems & LAC (Local Air Coolers) systems, drainage systems, fire detection & suppression systems within the HCF
 - Air Detritiation System (ADS): Network distribution of ADS within HCF
 - Liquid & Gas (LGAS): network distribution within HCF
 - Power Supply and Electrical distribution: power supply distribution within HCF and including Load Center in the scope and interface with other ITER buildings
 - Chilled Water System (CHWS): SIC and non-SIC
 - Cable Trays including the routing of the cables and pulling/termination for all systems inside the building and technical galleries within HCF is in scope
 - Instrumentation & Control (I&C) for all Systems provided by Contractor.
 - CODAC, Central Interlock System & Central Safety System: Instrumentation and Control system for all the systems is in the scope. Integration of common network architecture and interface with the CODAC, Central Interlock System & Central Safety System and ITER site buildings are in the scope
 - Access Control: doors, camera, sensors, security access in scope and major interface with ITER security requirements
 - Radiological and environmental monitoring systems (REMS).

The ownership of the scope is split as follows:

| PBS | Discipline / Scope | SCOPE |
|-----|--|-------|
| 61 | Infrastructure works | F4E |
| 62 | Civil Works | F4E |
| | Finishing Works | F4E |
| | Liner | F4E |
| | HVAC | F4E |
| | Building Electrical systems | F4E |
| | Control and Instrumentation | F4E |
| | Fire Detection, Alarm and Protection | F4E |
| | Nuclear Drainage | F4E |
| | Mechanical Equipment - cranes | F4E |
| | Mechanical Equipment - doors | F4E |
| | Mechanical Equipment - Lifts, turnstiles | F4E |
| 65 | Liquid and Gas Networks | F4E |
| 23 | Remote Handling | IO |
| 26 | Cooling Water Systems – H1 (PIC) South | IO |
| | Cooling Water Systems – H1/H3 (PIC) North | IO |
| | Cooling Water Systems – H2 non-PIC | IO |
| 32 | Tritium Plant (DS) – piping routing | IO |
| 43 | Steady State Power Supplies – Load Centre | F4E |
| 44 | Cable Trays of the HCF | F4E |
| 45 | CODAC | IO |
| 46 | Central Interlock System | IO |
| 48 | Central Safety System | IO |
| 64 | Radiological and Environmental Monitoring | F4E |
| | Radiological and Environmental Monitoring - routings | F4E |
| 66 | Radwaste Treatment and Storage, except Type A | IO |
| | Radwaste Treatment Type A | IO |
| 69 | Access Control – Security | IO |
| | Access Control – Communication with safety | IO |

4.2.2 For PACB

The contractor is responsible to design (as firm part of the future contract) and built (as an option of the future contract) the PACB.

Similarly to the HCF, the Contractor shall be responsible for the complete design, procurement, construction, testing, and commissioning of all technical areas introduced above for the PACB in section 3.

It is the responsibility of the Contractor to arrange the necessary infrastructures considering the clearance area for the Hot Cell extension.

The scope includes the foundations, main structure, earthing and lightning protection systems, finishing works as well as all technical services such as heating, ventilation and air conditioning (HVAC), mechanical, electrical, instrumentation and control, potable water, drainage, handling devices, fire detection and protection, and all equipment related to the access, control rooms and welfare functions.

PACB is F4E scope.

4.3 Out of Contractor's scope

- **Processes:**
 - Maintenance for Remote Handling Systems: *maintenance and test of IRMS are out of scope*
 - Radwaste type A solid: *cementation and buffer storage before export out of ITER site are out of scope*
 - Radwaste TFA: *buffer storage and characterization before export from ITER site is out of scope*
- **Building and its associated external platform and mechanical systems:**
 - NB cell door in TKM is excluded
 - Temporary Fence with INB area
 - As mentioned previously, it is reminded that HCF extension is excluded
- **HCF supporting systems:**
 - Air Detritiation System (ADS): HCF central unit systems design and supply are out of scope
 - Chilled Water SIC: Chillers unit capacities in TKC are out of scope with interface for the connection to HCF (see below)
 - Cask & Plug Remote Handling System (CPRHS): out of scope but major interface
 - Transfer and storage of IRMS equipment is out of scope,
 - Delivery of radwaste containers during operation is out of scope,
 - Design and delivery of TBM shipping flask is out of scope.

4.4 Scope boundaries and interfaces

4.4.1 Internal and external interfaces

Internal Interfaces correspond to the interfaces between systems or equipment within the HCF Project Contractor scope. External boundaries Interfaces correspond to the interfaces at the boundaries of the Contractor scope, meaning between a system (or equipment) within the Contractor's scope and a system out of the scope.

The HCF is part of the global ITER Project and thus must interface at its external boundaries with multiple project stakeholders, mainly:

- The Tokamak clients (i.e. In Vessel Components, Ex Vessel Equipment, IRMS, RW producers, etc.)
- The available centralized ITER support systems (electrical power, site utilities, cooling water, other site infrastructures, etc.)
- Other nuclear maintenance and radwaste systems (Hot Cell Extension, TFA Facility, Cold Test Facility, etc.) located outside of HCF (out of Contractor's scope) on ITER site
- The HCF will also need to interface with different external services (final repositories, outsourcing services, etc.)

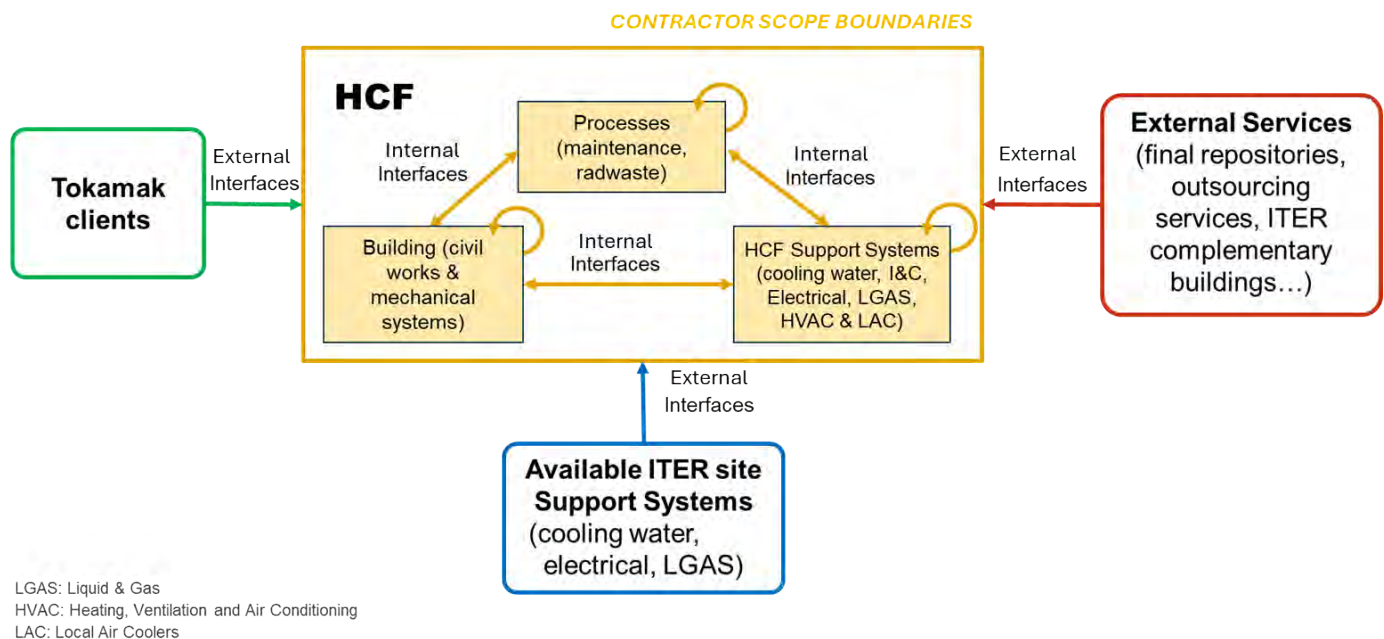


Figure 3: HCF scope and its internal and external interfaces

The HCF shall take into consideration the design of the different clients (IVC clients, Port Cell Equipment, miscellaneous...) which cover a great range of overall dimensions, weights and radiological content: from an activated Port Plug weighting several tenth of tons to much more standard pieces of equipment (pipes, valves, etc.).

Attention will need to be given to the differences of design maturity levels of the clients which will go from conceptual design level to already built components.

The HCF shall also respect the constraints coming from the site, for example:

- Global footprint allocation (for final building and construction phase)

- Civil work interfaces with the TKM building (Cargo Lift, NB Cell, Effluent tunnels)
- Road accesses
- Existing underground network
- Site utility allocations to the HCF (maximum electrical power supply demand, maximum Liquid and Gas supply allocation, maximum cooling water supply, etc.)
- Detritiation System capacities (HCF Air Detritiation System) and Water Detritiation System located in the Tokamak Complex,
- Surrounding buildings (existing, in construction, in operation, or planned after Hot Cell Facility construction)

The Contractor will be provided with External boundary Interface requirements. The Contractor will be in charge to ensure compliance with these External boundaries Interfaces requirement and to collaborate with the Client.

In addition, the Contractor shall develop the Internal Interfaces to the HCF, notably in between:

- the different process systems
- the HCF internal Supporting Systems (see definition in section 4.2.1)
- the building and all the systems contained in the HCB
- all the miscellaneous equipment located in the HCB

4.4.2 *Main External interfaces*

The list below is providing few examples of external interfaces between HCF Contractor scope and ITER support systems:

- Interface with Cask and Plug Remote Handling Systems (CPRHS)
- Interface with HCF central DS unit systems
- Interface with the stack located on B14 for HVAC
- Interface with TKM chilled water supply (SIC) for supply to HCF
- Interface with the CODAC, Central Interlock System & Central Safety System
- Interface with ITER security system
- Interface with Electrical power supply
- Interface with supply connections for the demineralized water, for the potable water network, for the breathing air site production, compressed air, hot water site network
- Interface with industrial drainage, precipitation drainage,

4.5 **Main missions**

The main missions of the Contractor shall notably be, for the whole implementation phase from Competitive Dialogue, contract award to the start of HCF operation:

- To successfully deliver the Contractor's scope described in section 4.1.
- To deliver and be accountable at each phase for the delivery of a fully integrated and functional HCF fit for its purpose, and within the price cap, schedule, requirements and performance.
- To ensure the global integration of all the systems at each phase (including systems out of scope, such central DS, RH cask, cementation mobile unit, IRMS container, etc)
- To perform the Nuclear Safety analyses, and to support the Client (Nuclear operator) in its exchanges with the French nuclear regulator ASNR

- To manage and control the HCF Project configuration, to track and propagate requirements
- To managed and be accountable for the HCF Project interfaces
- To develop and lead the implementation of the Quality Management system for the HFC Project, compliant with the IO MQP and approved by the Client
- To control, managed and report the Project costs, schedule and R&O in close coordination with the Client
- To work closely with the Client and identified stakeholders
- To handle ITER RESTRICTED information according to specific protection measures

4.6 Overview of phases

The Contractor shall develop a design plan that considers the different maturity levels of the systems and the Client's document schedule in an integrated engineering sequence.

First Design phase

The First Design phase will be performed during the Competitive Dialogue phase of the procurement procedure. It will allow the bidders to develop their solution (technical, cost, schedule) to a level sufficient for the bidders to commit on a robust and stable design and build firm offer. Similarly, it will enable the Client to select the best offer and award the contract to the selected bidder to deliver its offered solution.

Detailed Design phase

Upon contract signature, the contract execution phase shall start with the Detailed Design phase. This phase aims to complete the design to a level where the final definition of the facility is sufficiently complete to allow committing on and starting the manufacturing and construction, substantiated with a complete set of justification documents. It is the last phase before entering into construction phase.

Qualification phase

The Qualification phase shall start together with the Detailed Design phase and shall be completed ideally before launching the manufacturing for the SIC components identified by the qualification program.

Construction phase

The Construction phase includes manufacturing and supplies, the civil work construction, the support systems and processes installation, up to mechanical completion. The mechanical completion is the completion of a multi-disciplines system and the verification that the system has been correctly installed according to the procedures. It includes electrical, instrumentation, command-control, mechanical, piping, parts and components of the system or sub-system. Noted that the construction phase includes all associated design activities.

Test and Commissioning phase

The Test and Commissioning phase will allow to perform all required test and commissioning (at both the system and facility levels) to demonstrate compliance with all requirements and to finalize the demonstration of performances at all levels (systems, facility level, etc.).

The Contractor shall handle ITER RESTRICTED information according to specific protection measures.

4.7 Client / Contractor interactions

All along the contract execution, the Client will not interfere (except for specific topics described below or in the contract), and the Contractor remains fully responsible and accountable for its entire scope, including for the implementation of opportunities such as:

- A significant opportunity to add value through adoption of best-in-class procurement and contractual arrangements
- A significant opportunity to reduce project costs and optimize schedule by the adoption of best technological solution, standardization and use of COTS, best engineering sequence, and the early involvement of manufacturers and construction contractors in the design and construction phase

However, The HCF Project is characterised by features and topics that require specific interactions between the Contractor and the Client, such as:

- A need to interact efficiently with the Client for specific topics related to INB order and Nuclear Operator duties, such as for nuclear safety cases, licensing, etc
- Multiple scope boundaries interfaces between the Contractor and the Client, requiring dedicated organization for a successful management
- Site constraints management (e.g. access, co-activity, see section 3.1)

The contract may be improved with collaborative clauses and rules to be adjusted during the Competitive Dialogue phase.

4.8 Example of the expected main Contractor deliverables

Hereunder are few examples (limited list, non-exhaustive) of typical high-level deliverables that will be requested. The detailed list will be updated and clarified per phase in the technical specification at the Competitive Dialogue stage.

| Design Management | | |
|---|--|--|
| Design Plan and integrated engineering sequence | Document Production Plan | System management plan |
| Surveillance Plan | Change request & management | Deliverable list |
| Quality Plan | Procurement record | R&O report |
| Design description | | |
| System Design Description (SDD) | Design justification | Previous ROX |
| System load specification | Electrical load list | Fire loads |
| General Arrangements | Drawings (Sub-assembly, detail, iso) | Building drawings |
| Process Flow Diagram (PFD) | Piping and Instrumentation Diagrams | Doors schedule |
| Electrical diagrams | I&C documents | Bill of Material |
| Component list | Mechanical engineering model | Structural integrity report |
| Detailed Model | Software/programming Code | Calculation Reports |
| Systems Detailed Performance Def | Components technical specification | Tech spec to suppliers |
| Qualification Summary Report | Failure Modes and Effects Analysis / Failure Modes Effects and Criticality Analysis (FMEA/FMECA) | Hazard Identification and Risk Analysis (HIRA) |
| R&D plans | Equipment or Component List | Fire Protection analysis |

| | | |
|--|---|--|
| Investment Protection analysis | ALARA Analysis | Human Factor Analysis |
| Occupational Radiation exposure (ORE) assessment | List of PIC/SIC components | Maintenance plan |
| Mock-up and trials reports (physical and VR) | Component Classification Documents | Design calculations |
| Interface Control Document (ICD) | Interface Sheet (IS) | Finite Element Models (FEM) |
| RAMI Analysis | Remote Handling Compatibility Assessment (RHCA) | Remote Handling Plant Definition Form (PDF) |
| Remote Handling Task Definition Form (TDF) | Hazard Identification and Risk Assessment (HIRA) Analysis | Technical Procurement Specifications |
| Seismic analyses | Radiation hardness analyses | Heat loads analysis |
| Manufacturability analyses | Constructability analyses | Maintainability analyses |
| Manufacturing, construction, assembly and installation | | |
| Part drawing | Factory Qualification Test Plan | Acceptance Plan |
| Inspection & Test report | On-site assembly Plan | Manufacturing drawings |
| Shipping or Logistic plan | Assembly/Installation Plan | Assembly/Installation drawing |
| Operation, Maintenance, and decommissioning | | |
| Operations and maintenance manuals | Operational Sequence Descriptions (OSDs) | Operations management database and system |
| Maintenance or inspection plan | Maintenance instructions | Decommissioning Plan |
| System engineering, integration, justification | | |
| Detailed functional analysis for each phase of design | Compliance against functions, performances and requirements | Design compliance Matrix |
| Configuration management model | Interface Compliance Matrix | Design justification plan |
| 2D plans (Civil works and General Arrangements) | 3D models (compatible with IO tools and databases) | Level of details per design phase and margins definition |
| Integration reports (including clash analysis) | Transverse functions implementation | Transfer of models under IO format |
| Nuclear Safety | | |
| <p>Safety options file is the main deliverable at the end of the Competitive Dialogue.</p> <p>"Rapport de sûreté" Hot cell Safety file and supporting documents corresponding to the level of maturity of each design phase. Operation limits and conditions "Règles générales d'exploitation"</p> <p>Etc...</p> | | |
| Project Management | | |
| HCF detailed wbs | HCF detailed schedule | HCF cost estimate |
| HCF risks and opportunities register | Project management plan | Lessons learn, root cause, non-conformity management |
| Etc... | | |

5 HCF Project Timeline

The HCF project timeline encompasses the long-term scope of the contract, from contract award to completion of the integrated test and commissioning and start of operation. This contract requires a long-term involvement. The requirements on detailed schedule and mechanism will be presented at later stage of this procurement procedure, and the Contractor will develop its delivery schedule in compliance with those requirements.

Figure 4 gives a conservative illustration of the potential sequence of activities up to the Deuterium Tritium Operation (DT-1) phase. It may be subject to changes.

The contractual schedule will be finalized during the Competitive Dialogue process. Upon contract signature, this schedule shall allow sufficient margin and buffer against this timeline to mitigate risks and secure delivery for DT1 operation, while it is intended to provide the Contractor with acceptable flexibility in its implementation sequence to achieve optimization and schedule performance.

To be noted that:

- Maintaining the schedule is crucial for the timely release of a key project stage gate by the French nuclear regulator (Autorité de Sûreté Nucléaire et de Radioprotection “ASNR”).
- It is expected from the Contractor that technical solutions would be based on existing and proven techniques, aiming at reducing risks and delivery at fixed price. That said, innovative and disruptive solutions that reduce risks and delivery at fixed price are welcome.

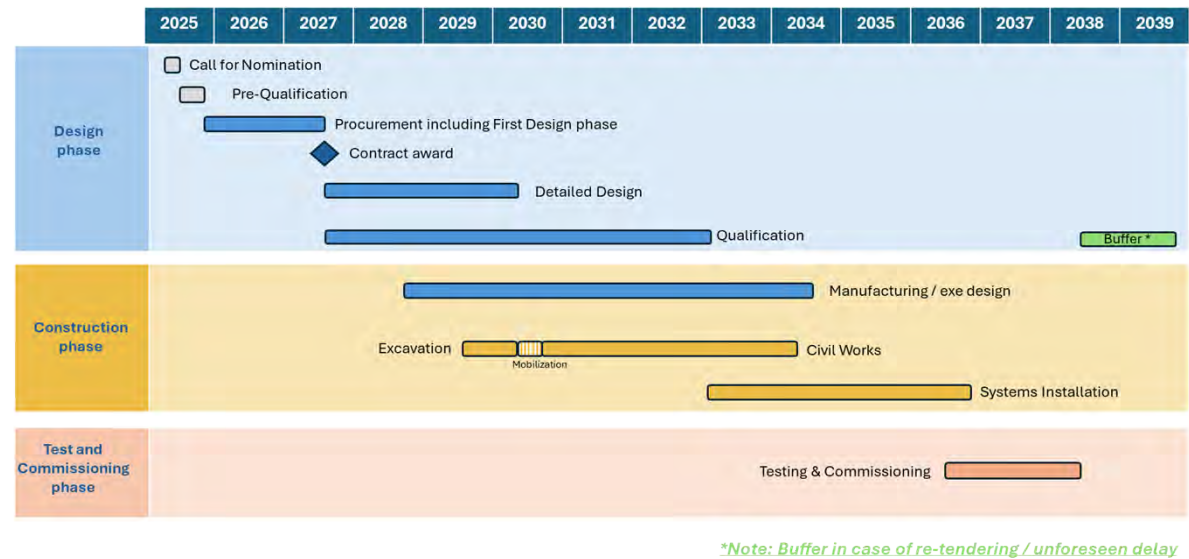


Figure 4 : Illustration of the potential sequence of activities – illustration only

6 Procurement Procedure

The chosen procurement procedure is Competitive Dialogue.

Competitive Dialogue is a procedure allowing competition, which is introduced for procurements that are complex in nature, where technical parameters are difficult or not defined in advance and need to be addressed with qualified selected economic operators (bidders).

Competitive Dialogue procedure follows Call for Nomination (CFN) and Pre-Qualification (PQ). First, the CFN process, the IO formally invites the Domestic Agencies to nominate potential candidates that are capable of providing the required supplies, services or works in order to enable the IO to pre-qualify the nominated companies. Second, the PQ process ensures that offers are sought only from qualified Candidates who have the requisite capacity and experience to satisfactorily perform the intended work. The aim of the PQ is to establish a list of qualified candidates based on the set of selection criteria. PQ process is conducted and the limited pre-qualified candidates are invited to take part in a Competitive Dialogue process.

Maximum 3 bidders will be selected from the PQ phase to participate during the Competitive Dialogue, while each and in parallel will produce, a First Design stage and the cost estimate of the scope with its associated time schedule

The main objectives of the Competitive Dialogue are the following:

- To achieve the most suitable design compliant with the nuclear safety objectives, the system requirements and the facility performances which enables to commit to the fixed price.
- To obtain a fixed price for the HCF below the price cap defined by the client
- To obtain an optimized long-term schedule meeting the target delivery date and intermediate milestones
- Bidders to endorse the functional and nuclear safety requirements and confirm the exhaustivity and clarity of technical specifications
- To get a safety demonstration and safety requirements compliant with the safety objectives
- Compliance with the resulting specifications
- To establish a cost-effective engineering process allowing to optimize the concurrent engineering and the construction sequence
- To identify cost-effective construction methods and technologies
- To refine and to agree the contractual scheme,
- To secure the early Contractor involvement and the long-term commitment
- To establish the basis of the safety demonstration (DOS)
- To enable the initiation of detailed design stage

The organisation of the Competitive Dialogue may be based on the following principles and steps:

In Competitive Dialogue, any qualified companies/consortia (bidders) submit an initial tender, in which proposed solutions will be further discussed and elaborated with the bidders.

The dialogue continues until one or more solutions are judged to satisfy the requirements. During the dialogue, contractual and commercial conditions are also developed to reflect the progress made in developing solutions. At this stage, the dialogue is concluded, and the bidders are invited to submit a best and final offer based on the finalized technical specifications and contractual conditions.

The Competitive Dialogue will result in a design and build contract awarded to the best value for money tender according to the criteria that will be defined in the Instructions To Tenderers.

Such contract will be awarded to a fixed price and the IO and F4E reserve the right to award one or several contracts at the end of the Competitive Dialogue. The works will be assigned progressively.

Bidders will be compensated during the First Design phase, per rules defined in the tender process.

The competitive dialogue is foreseen to last 18 months in total.

The compensation is a lump-sum amount dedicated to indemnifying the delivery of the First Design stage and the cost estimate of HCF Project at completion with its associated time schedule.

Specific mechanisms will be set-up to guarantee the full payment of the lump-sum as long as intermediate deliveries (i.e. commercial and technical offers) meet specific requirements that will be developed in the Instructions To Tenderers at later stage of the procurement procedure.

Disclaimer

The IO and F4E have a clear and firm intention to conduct the Competitive Dialogue process with the aim of awarding a Design and Build Contract, as outlined in this document. However, given the nature of the Competitive Dialogue, the IO and F4E reserve the right to make any necessary adjustments at their sole discretion, should such changes be deemed appropriate in the best interest of the project.

7 Procurement Schedule

A tentative timetable is outlined as follows:

| Procurement Schedule | Tentative Schedule |
|---|--------------------------------|
| Issue Call For Nomination | |
| Receipt deadline of Call For Nomination | |
| Issue pre-qualification | 30 th July 2025 |
| Receipt of pre-qualification | 16 October 2025 |
| Issue Competitive Dialogue | 15 th December 2025 |
| Best and Final Offer Submission | 16 th June 2027 |
| Estimated Contract award date | 27 th October 2027 |

Table 1: Tentative Timetable of the procurement

8 Application

The Client intends to award a contract to a single entity or grouping which will be called “Contractor” under the contract. The grouping could take different forms such as permanently and legally established one, or an ad-hoc consortium established for a specific tender procedure or project.

Application to the Competitive Dialogue tendering procedure is open to all legal entities participating either individually (as a single entity) or as consortium provided that:

1. A single entity, or consortium leader, and consortium member(s) and subcontractor(s) must be those entities established within the ITER member states.
2. The execution of the scope funded by the European Union (see the F4E scope and the ITER Scope described in section 4.2 of this Call for Nomination) shall be limited to economic operators that are legally established in the territory of a F4E Member.
3. A legal entity cannot participate individually or as a grouping in more than one tender application. Legal entities belonging to the same grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities.

In case of consortium, all members (i.e. the leader and all other members) will be jointly and severally liable to the Client. This is the Client’s standard requirement to ensure that the consortium as a whole will execute the project scope with full responsibility. Nevertheless, the tenderer could propose an alternative liability scheme and the Client may discuss it during tendering process including Competitive Dialogue if it may be judged pertinent and beneficial for the project.

Applicants (single entity or consortium) must comply with the selection criteria to be defined at the PQ (Pre-Qualification) stage. The details will be clarified at the time of PQ package.

The IO formally invites the Domestic Agencies to nominate potential candidates via Call for Nomination (CFN). Following the nomination (candidate list) submitted by each Domestic Agency to the IO, the Pre-Qualification and Competitive Dialogue will be launched via our digital procurement tool “IPROC”.

Interested bidders are kindly requested to register in the IO Ariba e-procurement tool called “IPROC”. You can find all links to proceed along with instruction going to: <https://www.iter.org/fr/proc/overview>. When registering in Ariba (IPROC), suppliers are kindly requested to nominate at least one contact person. This contact person will be receiving the notification for the follow-up tender process.

Additionally, when the Pre-Qualification documentation will be published, any interested economic operator will be able to participate in the Pre-Qualification phase by submitting the Pre-Qualification application in response to publication of the Pre-Qualification documentation.

9 HCF Project main features

The HCF Project involves design and construction of a large scale nuclear regulated facility, including building and process, and in particular hot cells, remote handling, radwaste management, tritium management and safety analysis, as exchanges with the ASNR.

The HCF Project involves the following activities:

| Domain | | Activities |
|--------------------|----------------------------|--|
| Project Management | Project Control | <ul style="list-style-type: none"> - Design to Cost method - Fixed price approach - Cost estimate - Schedule update and progress monitoring - Baseline Change Procedure - Earned Value Management - Risk and Opportunity management |
| | Technical management | <ul style="list-style-type: none"> - Design development for all disciplines - Manufacturing and supply for all disciplines - Construction and installation for all disciplines - Integration, management of Configuration, Requirements, interface, requirements, Interface - System Engineering - Digital Mock-up |
| | Quality management | <ul style="list-style-type: none"> - Quality in complex EPC projects - Systems thinking quality approach - Management of globalized supply chain - Data Management - Quality risk management |
| | Complex Project Challenges | <ul style="list-style-type: none"> - Development, support of resilient, sustainable solutions to manage Project challenges |

The HCF Project involves the following technical features:

| | Domain | Main features of the HCF |
|--|--|--|
| Nuclear civil engineering of complex large scale project | Strong links with industry and potential Plant manufactures | Some disparate leading edge/high-tech systems and equipment to be designed for in the Preliminary and Construction Design stages to avoid risk of change during suppliers manufacturing design. |
| | International projects | ITER stakeholders are China, the European Union, India, Japan, Korea, Russia and the United States. The project language is English and safety documentation to be delivered to the French safety authority shall be in French and English. |
| | Engineering/design | Design and overall integration of (see scope for exhaustive details): <ul style="list-style-type: none"> - Building structure. Net Volume HCF 100,000 m³ nuclear concrete building - Approximately 200 rooms within the HCF including process rooms but also shafts, airlocks, changing room, segregation of confinement and external aggressors' systems, corridors, etc - Building systems, e.g. Heating, Ventilation, and Air Conditioning (HVAC), fire protection, electrical distribution, Instrumentation & Control (I&C), cabling, liners, red zone cooling, - Mechanical heavy handling, e.g. cranes, nuclear shielding and confinement doors, trolleys, - Utilities platform e.g. electrical systems (load centers), liquid and gas production and distribution, tank storage, fire protection and evacuation, etc. |
| | Nuclear HVAC | Nuclear HVAC system applying ISO17873 standard recommendations and promoting the isolation of the rooms upon tritium detection. Red zones cooling function |
| | Fire Protection | Management of fire loads, air conditioning, fire protection and mitigation |
| | Network routing (e.g. cabling, piping, HVAC), management of penetrations and anchorage | Approximately 350+ Instrumentation panels and 130+ Electrical distribution boards is to be in the building. Also, there are Distribution Transformers, MV/LV switchgears, UPS and batteries located inside the Load Center associated with HCB. Approximate Cable Trays (highways) length is 15km+. Routing of HVAC, cable trays, DS piping. Segregation of routing for PIC functions (e.g. power supply, instrumentation) |
| Hot Cells expertise | Numbers of hot cells / red zones | Hot cells in HCF, in total volume of red zones / C4 ventilation class = 1,600 m ³ : Including decay buffer storage area, operation buffer, maintenance, export of Test Blanket modules and Post Irradiation operation and cleaning and decontamination red/C4 zones. There are temporary red zones. For example: <ul style="list-style-type: none"> • The cask is not shielded, and the transfer of activated components leads to temporary red zones like the cask transfer area. • The transfer of liquid radwaste to the drain tank room can lead to temporary red zone depending on the scenario of transfer. |

| Domain | | Main features of the HCF |
|---------------------|--|---|
| | Management of irradiated and contaminated components | <p>Activated and contaminated objects/components from TKC</p> <p>Radiation sources and order of magnitude for DT1:</p> <ul style="list-style-type: none"> • activated components/objects: dose rate up to few Sv/h • Activated dust (mix of Tungsten, stainless-steel, boron), around 200 kg spread on components/objects • Tritium, around 100 g spread on components /objects • ACP in water, filters, resins |
| | Tritiated environment | Tritium contaminated components leading (through outgassing and dust resuspension) to airborne contamination in premises up to C4** (ISO 17873), T4** (ISO level 16646) levels. |
| | Nuclear maintenance | Multiple large hot workshops, providing the space and means to perform hands-on maintenance on components and in-vessel remote handling systems, following remote decontamination. |
| | Remote heavy handling in red zone | <p>Remote handling and management of various large and heavy components in the performance of cleaning, decontamination, inspection, Post Irradiation Examination and limited maintenance. Approximate mass and size of components to be handled include, but are not limited to:</p> <ul style="list-style-type: none"> – Equatorial Port Plug (50t, 3.5m length x 2.4 m x 2m), – Upper Port Plug (25t, 6 m length), – Divertor (9t, 3.5m length, 2m high, 0.8m wide), – Vacuum Cryopump (2.9m length, 1.7m diameter), – Oversized Neutral Beam components up to 8m length, 3m high and 3.3m wide <p>First Wall and Shield Block (5t, ~1m x 1m)</p> |
| | Docking of transfer casks | Transfer and docking of Remote Handling Transfer Cask, large size confinement docking system, ~2m x 2.4m |
| Radwaste management | Treatment of radioactive solid waste | <p>Cutting of large metallic waste, sampling, packaging, sorting, characterization, laboratory analysis, tritiated waste container storage, radwaste container transport, radioactive sample export</p> <p>Orders of magnitude for 10 years operation:</p> <ul style="list-style-type: none"> – 100 tons FMA-VC with low dose rate (for processing) – 600 tons FMA-VC with high dose rate (for storage) – 50 tons purely tritiated waste – 700 tons TFA |
| | Treatment of radioactive liquid effluent | <p>Design of radioactive liquid effluent storage and processing systems: storage, transfer, evaporation, filtration, ion exchange, sampling, laboratory analysis</p> <p>Orders of magnitude:</p> <ul style="list-style-type: none"> - 200 m³ / year of high activity aqueous effluents - 1000 m³/year of low activities aqueous effluents - 7 m³/year spent resins, 7 m³/y oils, 500 litre/y scintillation cocktails |
| | Complex remote operation | <p>Remote performance of cleaning, decontamination, inspection, Post Irradiation Examination and limited maintenance.</p> <p>Design and integration of:</p> <ul style="list-style-type: none"> – Power manipulators / mobile robotic systems – Electrical master-slave manipulators – Overhead handling systems – Trolleys / floor mounted movers – Lighting and viewing systems |

| Domain | | Main features of the HCF |
|--------|--|--|
| Safety | | <ul style="list-style-type: none"> – Frames and handling tools – Inspection, sampling, cleaning, decontamination, maintenance tooling suites |
| | Centralized control system | Key features of the HCF centralised control system, located in the PACB (out of scope) are the remote control and operation of building systems (HVAC, cargo lifts and doors, remote transfer systems, remotized maintenance systems for IVC, remote radwaste treatment, environmental and video monitoring systems. Key functions include operational management systems, virtual reality system, digital twin, etc. |
| | Civil and mechanical works | Large and complex nuclear concrete structures to be design with multiple physical interfaces with equipment and existing buildings and built on a construction site partially in operation. Mechanical works (doors, lifts, handling systems, platforms,...) design, manufacturing and installation with specific confinement/shielding/ seismic requirements |
| | Seismic requirement | Buildings structures/support systems and process, seismically classified according to the safety analysis, subject to high seismic design and construction requirements, and in particular for the interfaces definition. |
| | Safety demonstration | Full traceability of safety requirement, from the “high level” safety requirement to the detailed safety requirement, their implementation and the demonstration of meeting the expected performances for the facility, systems and components with a specific focus on safety functions and PIC. Demonstration of compliance with French nuclear and radiation safety regulation and implementation of ITER safety approach regarding safety analysis and demonstration. |
| | ALARA | A formalized ALARA approach is mandatory and implies that at each design stages, an assessment of the ORE (Occupational Radiation Exposure) should be conducted according to the maturity of the design and the CONOPS and dose reduction measures identified accordingly. |
| | Human and Organizational Factors (HOF) | Integration of HOF into the design, operation, maintenance and decommissioning is mandatory and should follow the principles and approaches presented in the ITER Human Factor integration plan, The corresponding activities and deliverables are also specified in this plan. |
| | French Nuclear Regulator licencing process | The licensing process in addition to the milestones associated to the delivery of regulatory safety files implies technical exchanges with the French regulatory bodies. The contractor is expected to contribute to the answers, additional studies and document updates to be provided during this process. |

Table 2: HCF Project main features (indicative values)

Appendix 1: Abbreviations

| Abbreviation | Definitions |
|--------------|---|
| ADC | Complementary Applicable Document |
| ADS | Air Detritiation System |
| ALARA | As Low As Reasonably Achievable |
| ASNR | « <i>Autorité de Sûreté Nucléaire et de Radioprotection</i> » - French Safety Authority |
| Be | Beryllium |
| C4 | Ventilation Classification C4 according to ISO 17873 |
| CFN | Call for Nomination (step of IO procurement) |
| CODAC | Control, Data Access and Communication |
| CPRHS | Cask & Plug Remote Handling System |
| DAC | Derived Atmospheric Contamination |
| DBA | Design basis accidents |
| DEC | Design extension conditions |
| DCM | Design Compliance Matrix |
| DIR | Design Integration Review |
| DT1 | Deuterium Tritium phase 1 of ITER operation |
| DT2 | Deuterium Tritium phase 2 of ITER operation |
| ED | Detailed Safety Requirement (former “Exigence Définie”) |
| EVE | Ex-Vessel-Equipment |
| F4E | Fusion For Energy, European Domestic Agency |
| FMA-VC | Low and Medium Activity, Short Life Radionuclide (called “Type A radwaste” at ITER) |
| HCB | Hot Cell Building (also referred to ITER Building 21) |
| HCF | Hot Cell Facility |
| HCF ext. | Hot Cell Facility Extension |
| HVAC | Heating, Ventilation, and Air Conditioning |
| I&C | Instrumentation & Control |
| ICD | Interface Control Document |
| INB | « <i>Installation Nucléaire de Base</i> » - Nuclear Facility |
| IRMS | ITER Remote Maintenance System |
| IS | Interface Sheet |
| IVC | In-Vessel-Component |
| LAC | Local Air Cooler |

| Abbreviation | Definitions |
|--------------|--|
| LGAS | Liquid & gas |
| LOCA | Loss Of Coolant Accident |
| MAVL | Medium Activity, Long Life Radionuclide (called “Type B radwaste” at ITER) |
| MBSE | Model Based System Engineering |
| MQP | Management and Quality Program |
| PACB | Personal Access Control Building |
| PCR | Project Change Request |
| P&ID | Piping and Instrumentation Diagram |
| PIA | Protection Important Activity |
| PIC | Protection Important Composant |
| PIE | Post Irradiation Examination |
| PFD | Process Flow Diagram |
| PP | Port Plug |
| PQ | Pre-Qualification (step of the IO procurement) |
| QAP | Quality Assurance Program |
| QD | Safety Requirement (former “Qualité Définies”) |
| R&O | Risks and Opportunities |
| REMS | Radiological, Environmental & Monitoring Systems |
| RPrS | « Rapport Préliminaire de Sûreté » - Preliminary Safety report |
| RS | Rapport de sûreté |
| RW | RadWaste |
| SIC | Safety Important Component / Safety Important Class |
| SSC | Structures, Systems and Components |
| SLD | Single Line Diagram |
| SOF | Safety option files |
| SRD | System Requirement Document |
| SRO | Start of Research Operation |
| TBM | Test Blanket Module |
| TFA | Very low-level radwaste |
| TKM | Tokamak |
| VE | Value Engineering |

Appendix 2: Conflict of interest Principles

These principles apply to parent companies and their subsidiaries.

Principle 1

A company involved in the design & build HCF contract, as part of any Entity* or as a subcontractor, is not allowed to bid for any tenders related to external control and supervision (such as audit, project control, cost control, works supervision, etc., see notably stakeholders listed in clause 3.4) of the Design & Build contract.

Principle 2

A company involved in the writing of any part of the Design & Build tender package (draft contract and technical specifications) is not allowed to bid, as part of any Entity* or as a subcontractor, for the Design & Build contract.

** Entity is defined as either a single existing company, or a company participating in a single existing entity whatever its role within this single existing entity, or a consortium, or a company participating in a consortium whatever its role within the consortium, or a company participating in a new legal entity whatever its role within the new legal entity.*

Appendix 3: High-level functional analysis

This appendix presents the high-level functional analysis performed for the Hot Cell Facility. This analysis focuses mainly on the processes, meaning the client needs. The description of the functions are mentioned in section 3.2 and this appendix presents extracts from the MBSE Capella-modelling, providing a schematic overview of the functional analysis.

The breakdown of the diagrams presented below are to be read and understood in hierarchical order as a fennel:

- Figure 5: 1st level functions for the HCF - maintenance and radwaste
 - Figure 6: 2nd level functions for the HCF - maintenance
 - Figure 8: 3rd level functions for the HCF – maintenance of IVC / EVE / IRMS
 - Figure 9: 4th level functions for the HCF – maintenance of In-Vessel-Component (IVC) general sequence
 - Figure 10: 5th level functions for the HCF – maintenance of TBM (Test Blanket Module)
 - Figure 11: 4th level functions for the HCF – integration of the maintenance of Ex-Vessel-Equipment (EVE) general sequence
 - Figure 12: 4th level functions for the HCF – integration of the maintenance of IRMS (ITER Remote Maintenance System) general sequence
 - Figure 7: 2nd level functions for the HCF – solid and liquid radwaste
 - Figure 13: 3rd level functions for the HCF – radwaste management (solid/liquid)
 - Figure 14: 4th level functions for the HCF – solid type A radwaste
 - Figure 15: 4th level functions for the HCF – liquid radwaste

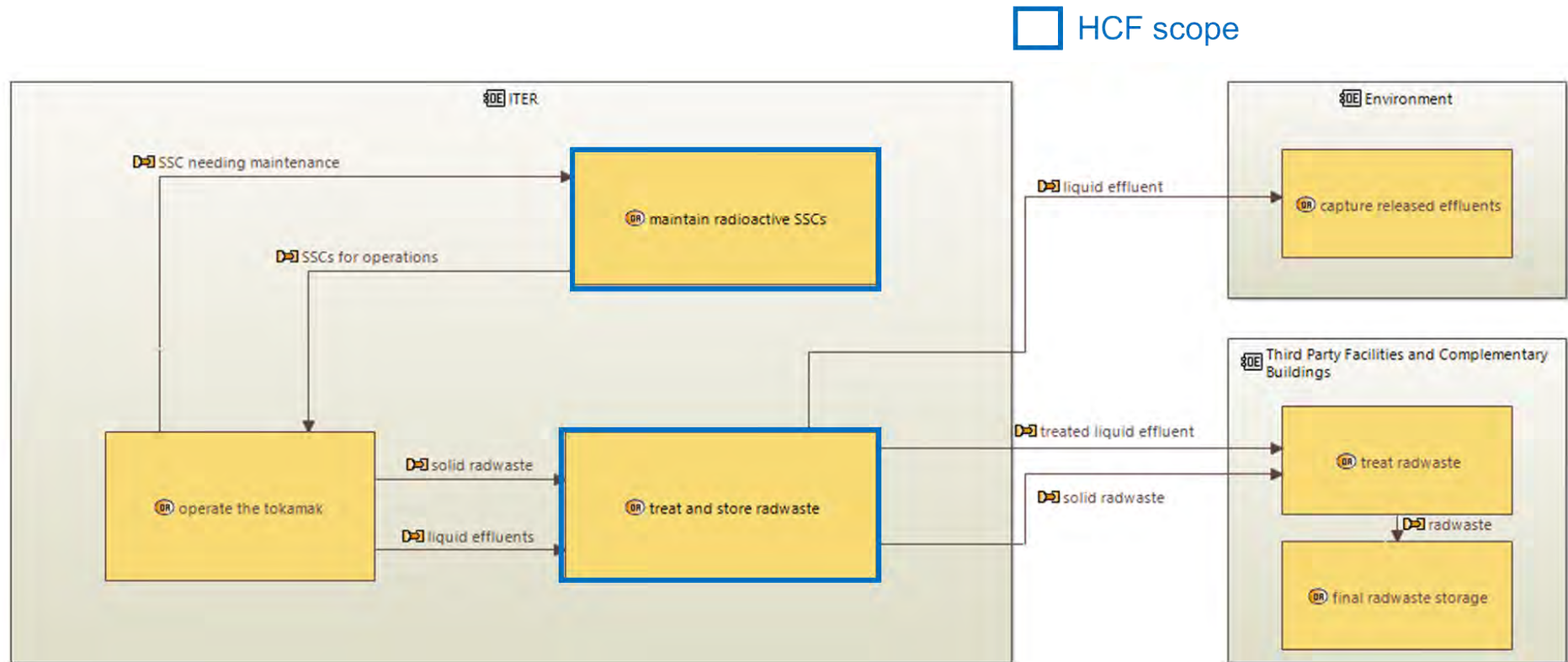


Figure 5: 1st level functions for the HCF - maintenance and radwaste

HCF scope

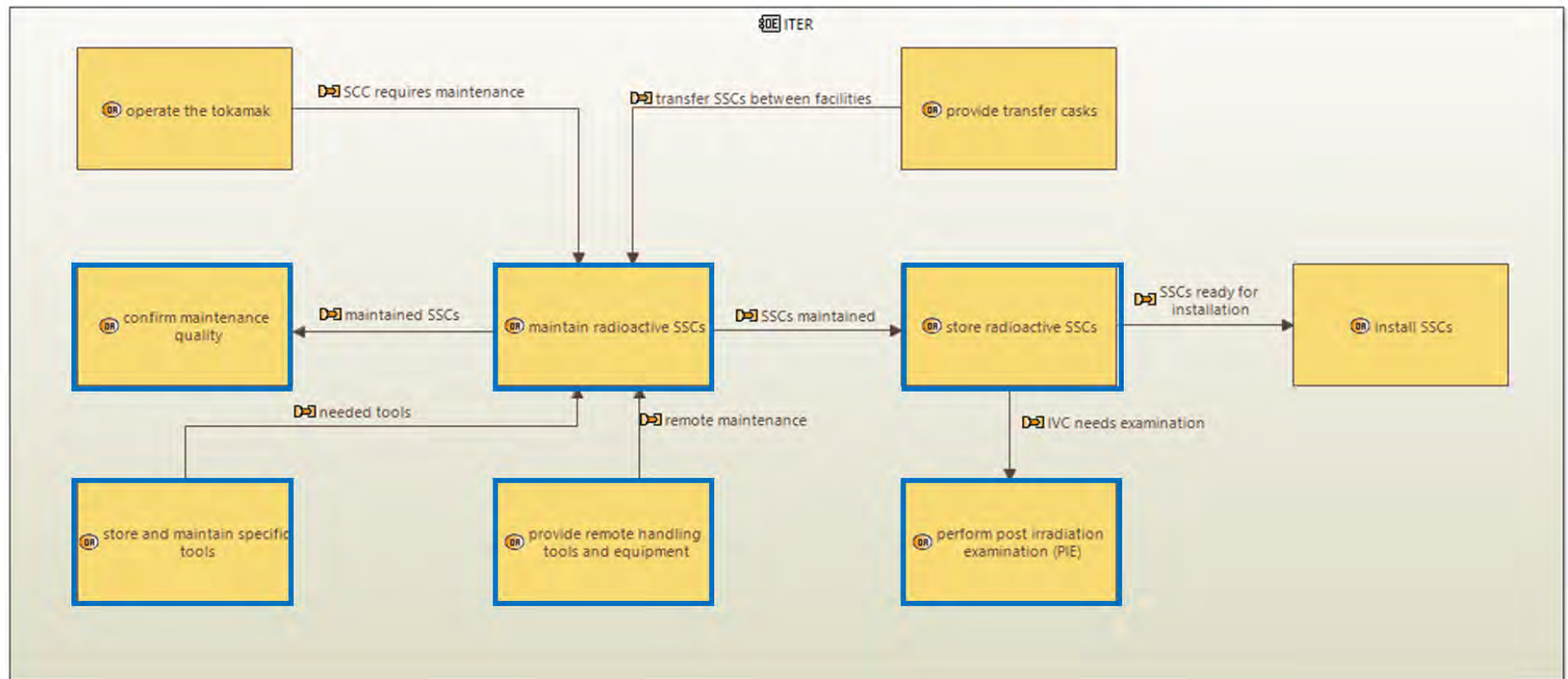


Figure 6: 2nd level functions for the HCF - maintenance

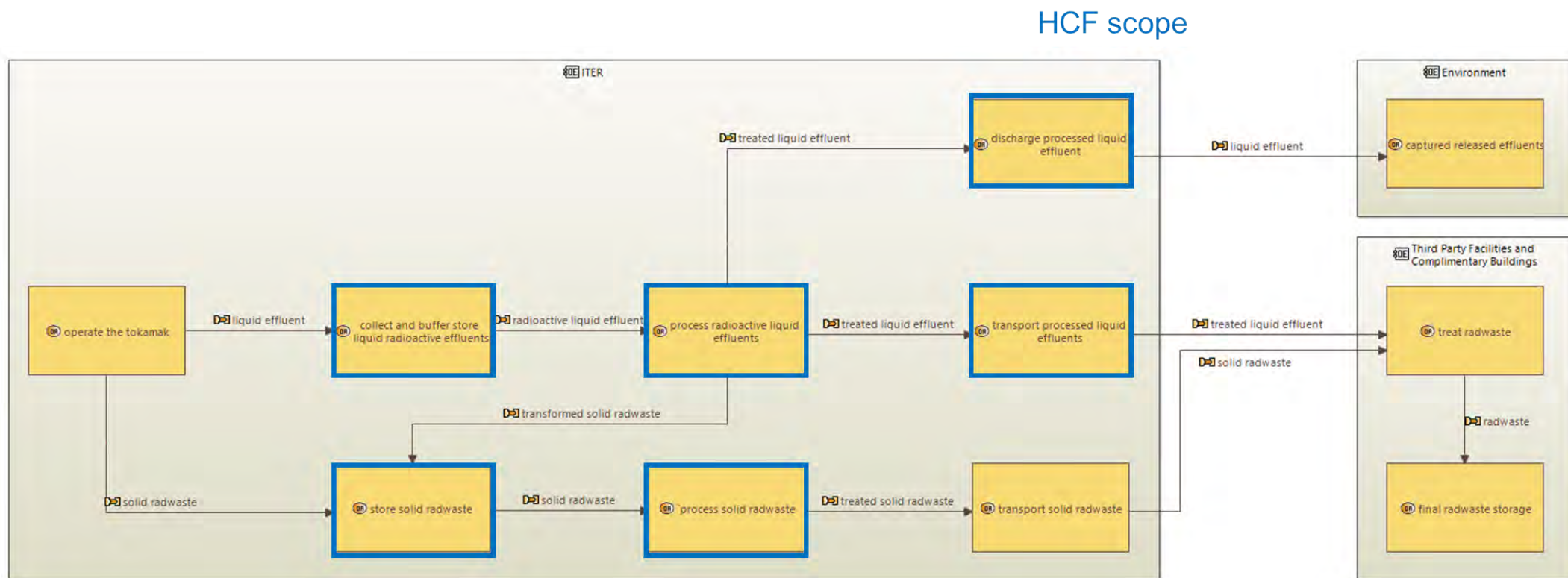


Figure 7: 2nd level functions for the HCF – solid and liquid radwaste

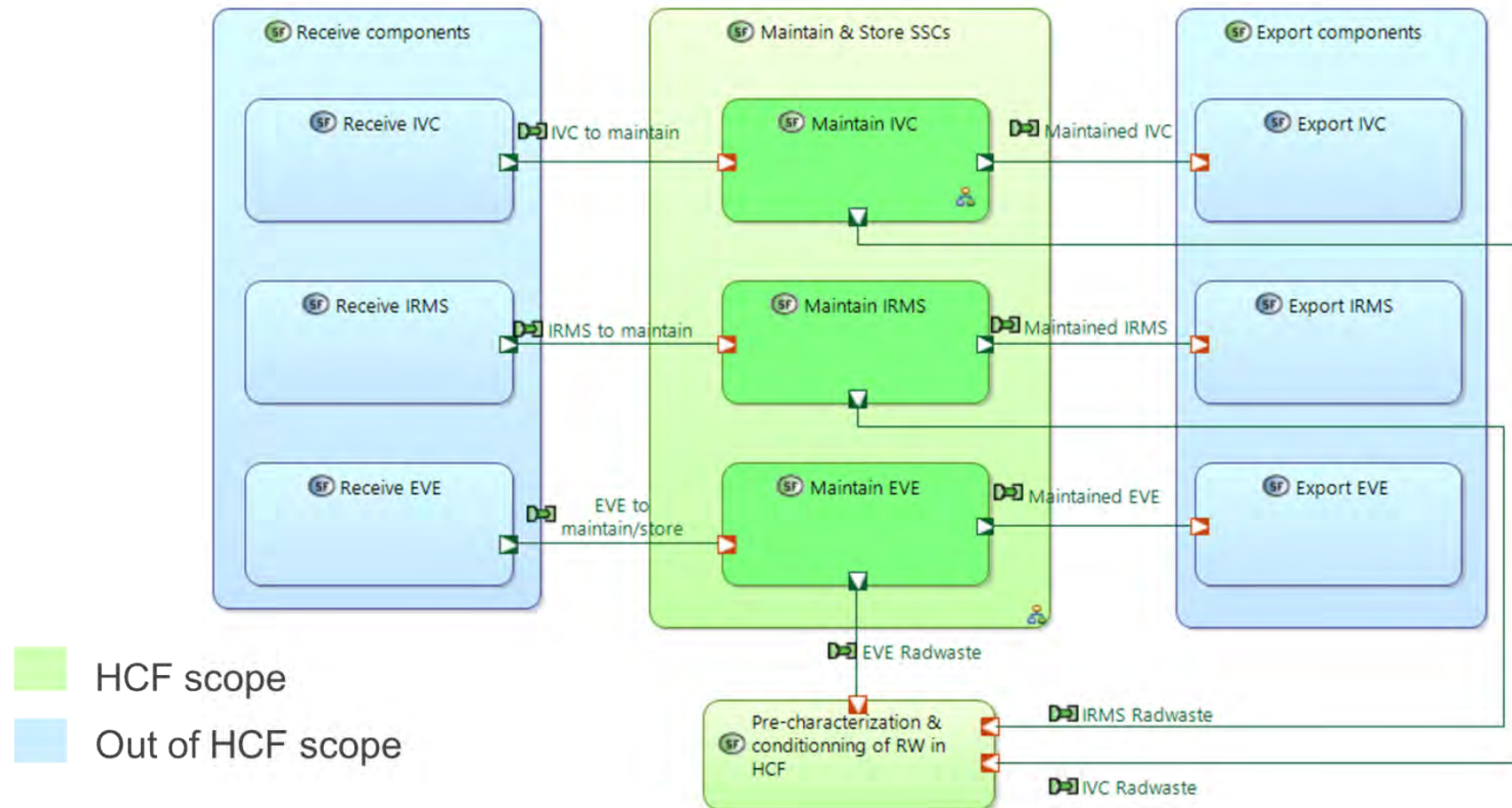


Figure 8: 3rd level functions for the HCF – maintenance of IVC / EVE / IRMS

IVC: In-Vessel-Component
 IRMS: ITER Remote Maintenance System
 EVE: Ex-Vessel-Equipment

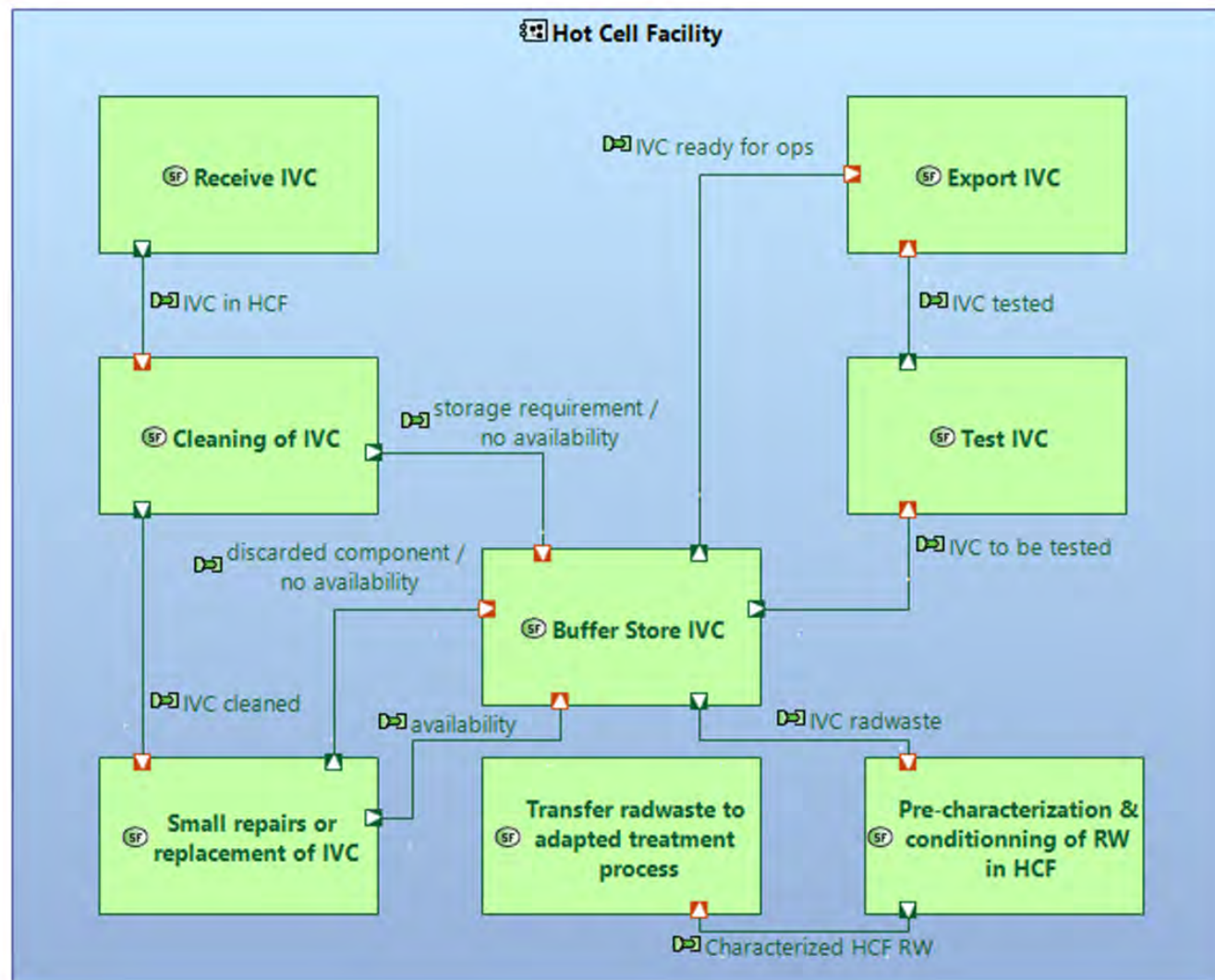


Figure 9: 4th level functions for the HCF – maintenance of In-Vessel-Component (IVC) general sequence

Based on Figure 9, by focusing on the box “Small repairs or replacement of IVC”, the following diagram is obtained for the IVC TBM case:

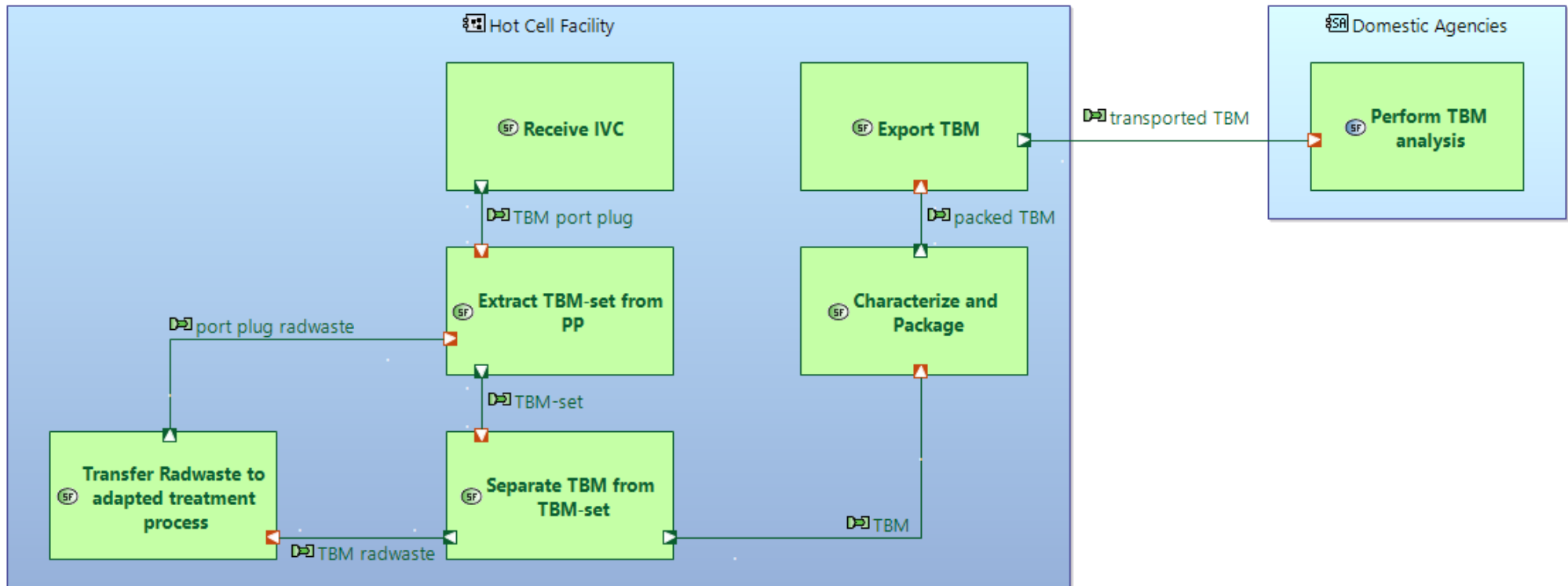


Figure 10: 5th level functions for the HCF – maintenance of TBM (Test Blanket Module)

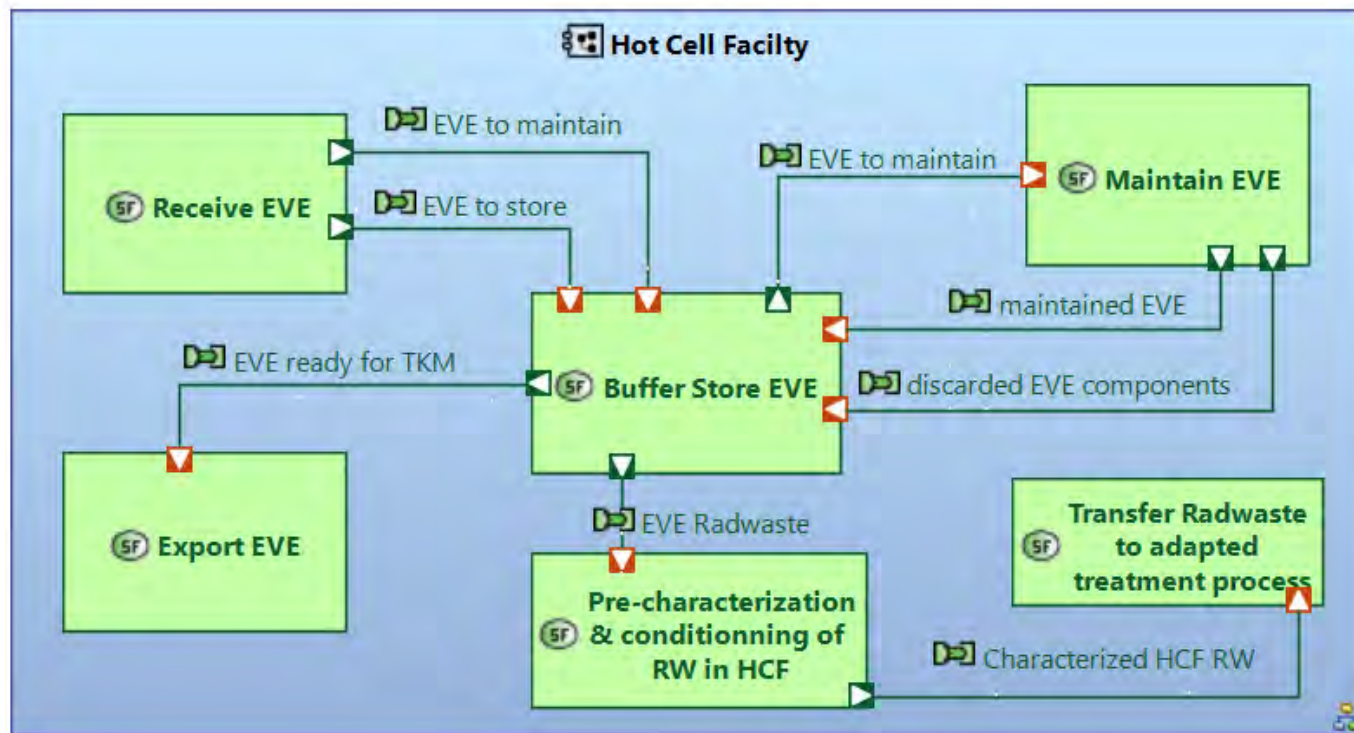


Figure 11: 4th level functions for the HCF – integration of the maintenance of Ex-Vessel-Equipment (EVE) general sequence

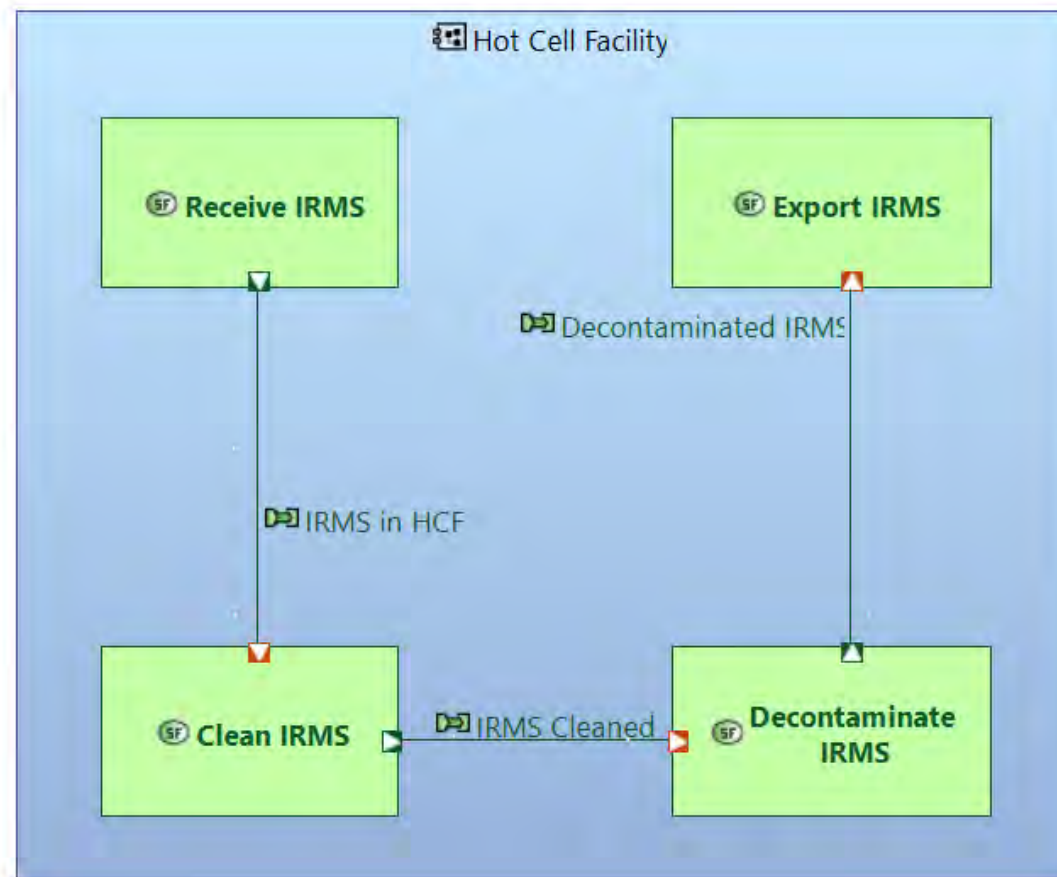


Figure 12: 4th level functions for the HCF – integration of the maintenance of IRMS (ITER Remote Maintenance System) general sequence

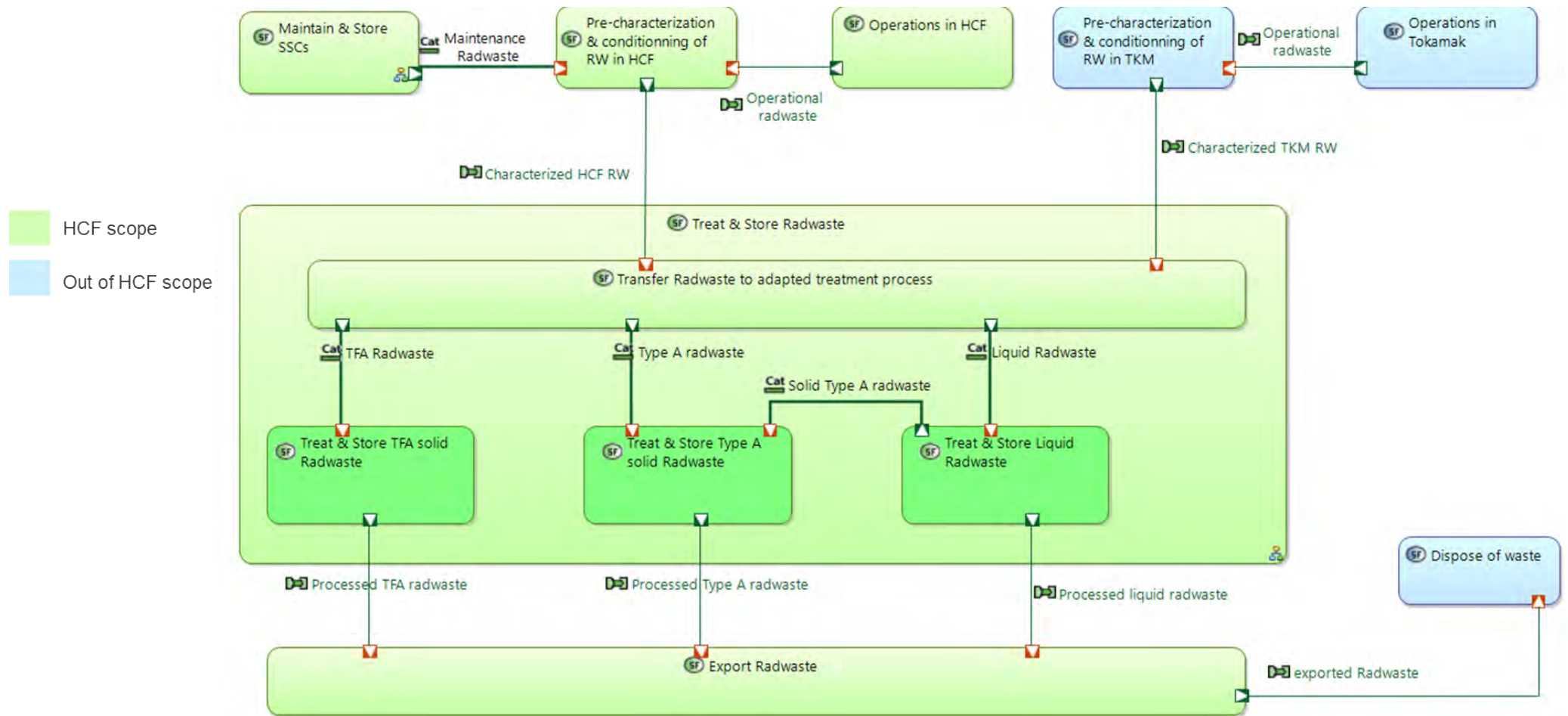


Figure 13: 3rd level functions for the HCF – radwaste management (solid/liquid)

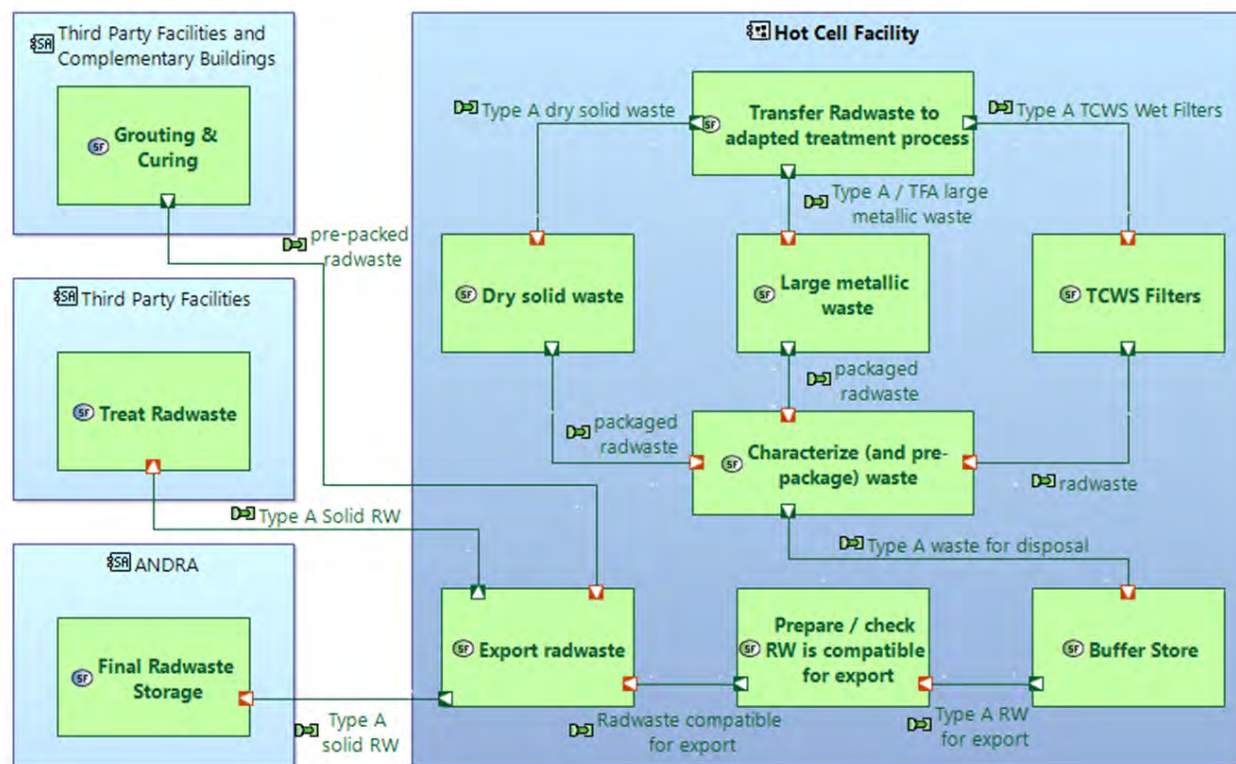
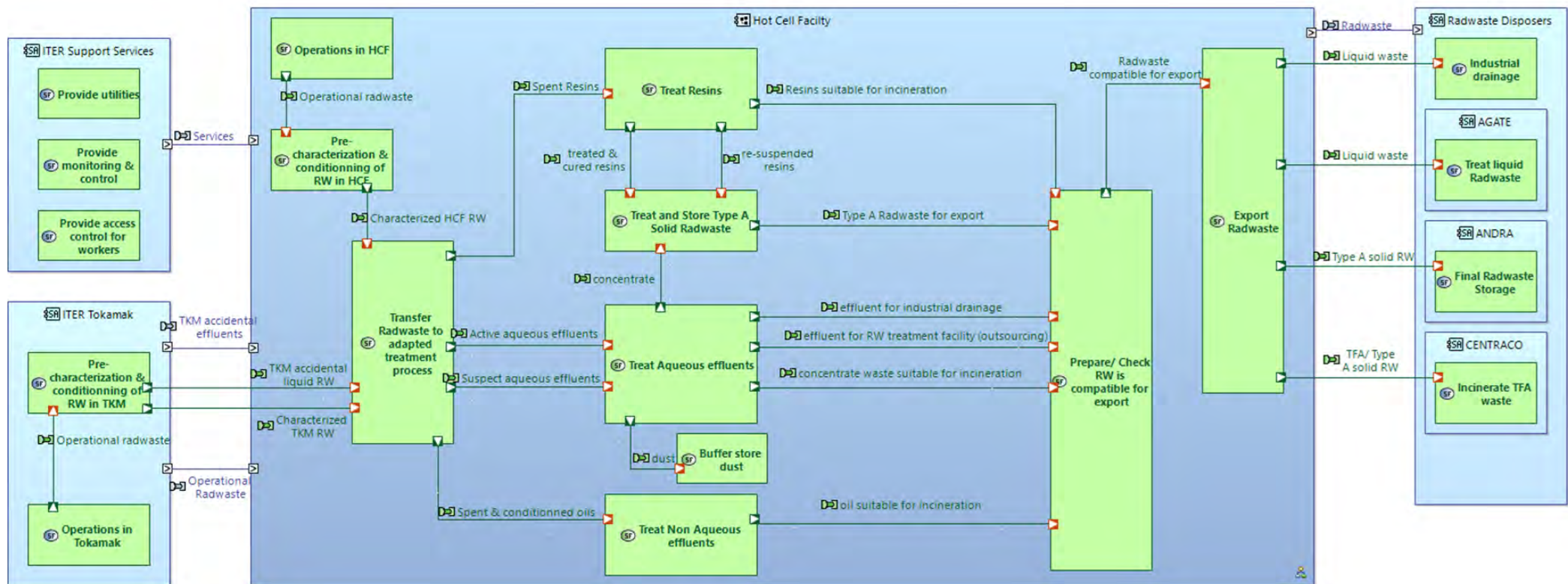


Figure 14: 4th level functions for the HCF – solid type A radwaste

Figure 15: 4th level functions for the HCF – liquid radwaste

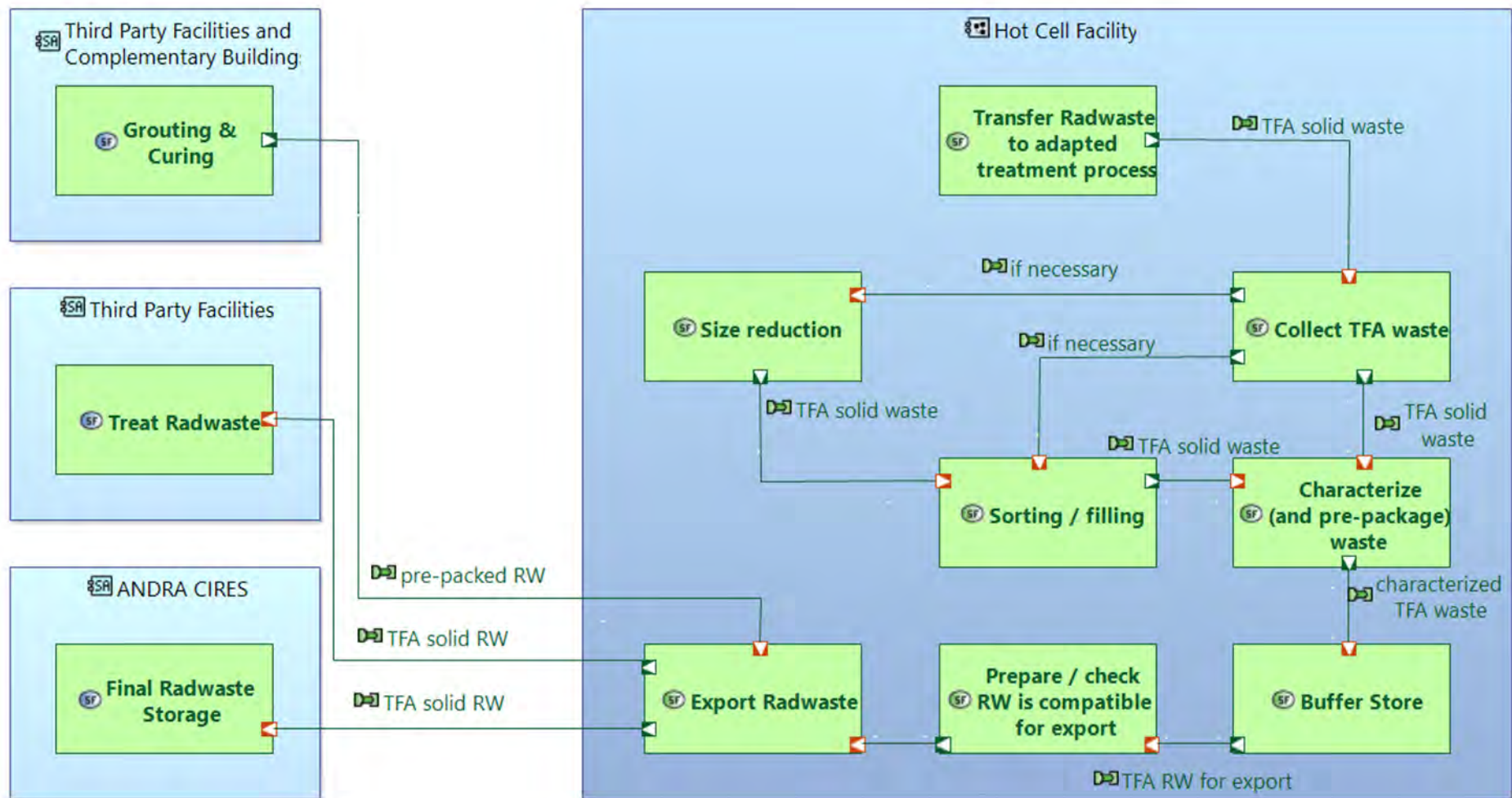


Figure 16: 4th level functions for the HCF – solid TFA radwaste

Appendix 4: Safety Approach

HCF being at preconcept level stage, safety starts with the establishment of high-level safety requirements that are not solution oriented and which quantity and completeness will develop with the design process. The safety requirements establishment usually follows the logical sequence described below:

1. Application of national regulation (environmental code, labour code, public health code, INB order, decision ASN 616, ...)
2. Application of dedicated requirements from the regulator issued specifically for the facility (decree, PT)
3. Breakdown, refinement, tailoring of requirements from 1 and 2 through an iterative safety analysis process that takes into account the design of the facility at its different stages of maturity, the radiation hazards associated with the facility, the potential accidents from events and circumstances resulting from external and internal hazards, components failure, human factors.

The high-level safety requirements provided by ITER for HCF are based on steps 1 and 2 of the above sequence. They are limited in number and open (not solution oriented) to allow the rolling of the engineering process with the required flexibility to identify the best design solution. It is important to keep in mind that the strategy chosen by the project regarding safety high level requirements and their potential revision consist in not challenging the ITER decree in a way that it would constitute a “substantial modification” of it, leading to the need for a new decree implying the associated full administrative procedure including public inquiry.

This strategy implies also to not challenge the boundaries and typology of the facility nuclear safety stakes presented in the supporting files (RPrS, Impact study) associated to the obtention of ITER decree, which in more concrete way consists in:

1. Complying with the existing general safety objectives (GSO) and collective dose objective already defined,
2. Complying with the releases (gaseous and liquid effluents) foreseen during normal operation presented in the impact study,
3. Not drastically challenging the maximum radiological (and hazardous substances) consequences on environment and public presented in the RPrS for the different categories of event from design basis accidents (DBA) up to design extension conditions (DEC) included,
4. Not introducing a new hazard that would require, due to its potential ability to jeopardize the interest to be protected, to be explicitly considered in the decree,
5. Not leading to the creation of ICPE categories/thresholds (radioactive or not) that would lead ASNR to challenge ITER decree
6. Ensuring that off-site, from the fence and beyond, the area is an unregulated area (white zone with effective dose below 80 $\mu\text{Sv/month}$) from radiation zoning perspective; same condition is applied on site to normally accessible zones located outside the buildings housing radiation sources.

In addition, it can be added the capability to limit radwaste production and ensure their management up to their evacuation to waste disposals. This one is not a purely safety topic but it is a requirement from French Nuclear safety authority INB order titre VI “waste management”,

and ITER decree article 2.V.5). Regarding radwaste, it can be reminded that the decree (art 2.V.5) specifies that the operator shall take all the necessary measures so that the waste produced during the facility's experimental operation can be removed from the facility after radioactive decay at the latest ten years following the end of this experimental operating period.

The Contractor is in charge to take ownership of the high-level safety requirement and refined them according to step 3 in compliance with the ITER strategy described above and the design development.

This integration and development of the safety requirements must lead to the production of a safety option file (SOF) as a deliverable of the Competitive Dialogue. The table of content of the SOF will be proposed by ITER and a collaborative approach and intermediates milestones for its delivery will be defined in the contract. The SOF will be submitted to the French regulator and the contractor is expected to participate potentially to technical meetings with the authority and to the update of the document as needed.

It is paramount that the SOF is achieved through a close collaboration between safety engineers and designers within the Contractor team as well as between Contractor and Client in an iterative process to ensure consistency and feasibility. The different alternatives studied regarding safety options and the justification for the final choices made in the SOF shall be traced. Deviations from the principles/approaches specified in the high-level safety requirements and reference documents shall be presented, justified and discussed with ITER organization.

The SOF will be delivered at the end of the Competitive Dialogue and validated at the First Design stage milestone. The following phases of the engineering process foreseen in the design and build Contract implies gate reviews for which HCF “rapport de sûreté” (RS) are expected to be delivered. The content of the RS shall be compliant with the regulator decision n 2015-DC-0532 from 17/11/2015, the high-level safety requirements and take into consideration the feedback of the authority regarding the SOF.

The detailed organization, tasks, resources, schedule and intermediate milestones and studies implemented for the delivery of the RS and associated files shall be presented to ITER organization for validation.

As for the SOF, it is paramount that the safety deliverables are performed in close collaboration and consistency with designers.

Appendix 5: Illustration of Preconcept 2024

Caution: the information presented below is not a requirement but an illustration of a pre-concept.

The HCB and HCB-Extension (if deemed necessary) are located on the area 28, on the northern side of the Tokamak Complex.

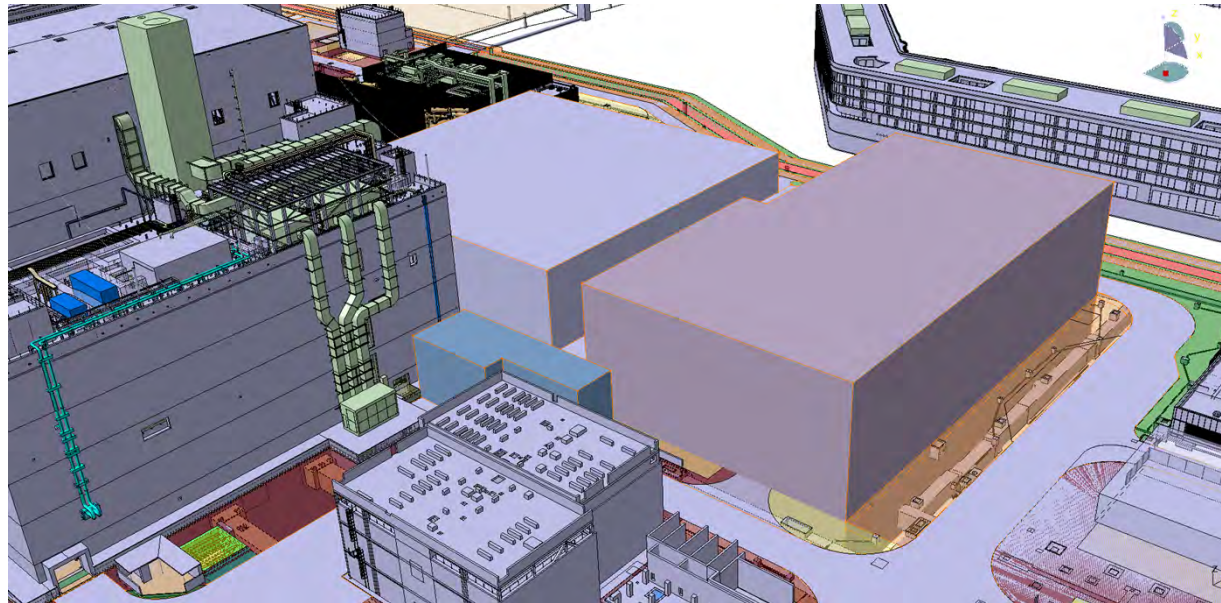


Figure 17 Zoom on the Area 28

The illustrative overall dimensions of the HCB preconcept are:

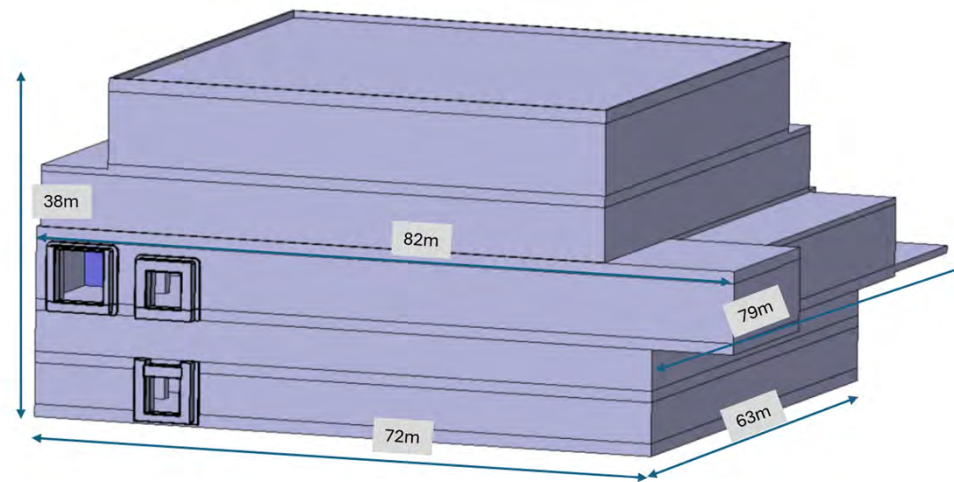


Figure 18 : 3D model of the 5 storey HCB

| Dimension | HCB |
|----------------------|---|
| Length (North-South) | 63 m up to 79 (for the truck bay) at L1 |
| Width (East-West) | 72 m up to 82 (for the cask rotation) at L1 |
| Total Height | 38m |
| Height above ground | 25 m (+ roof installations) |

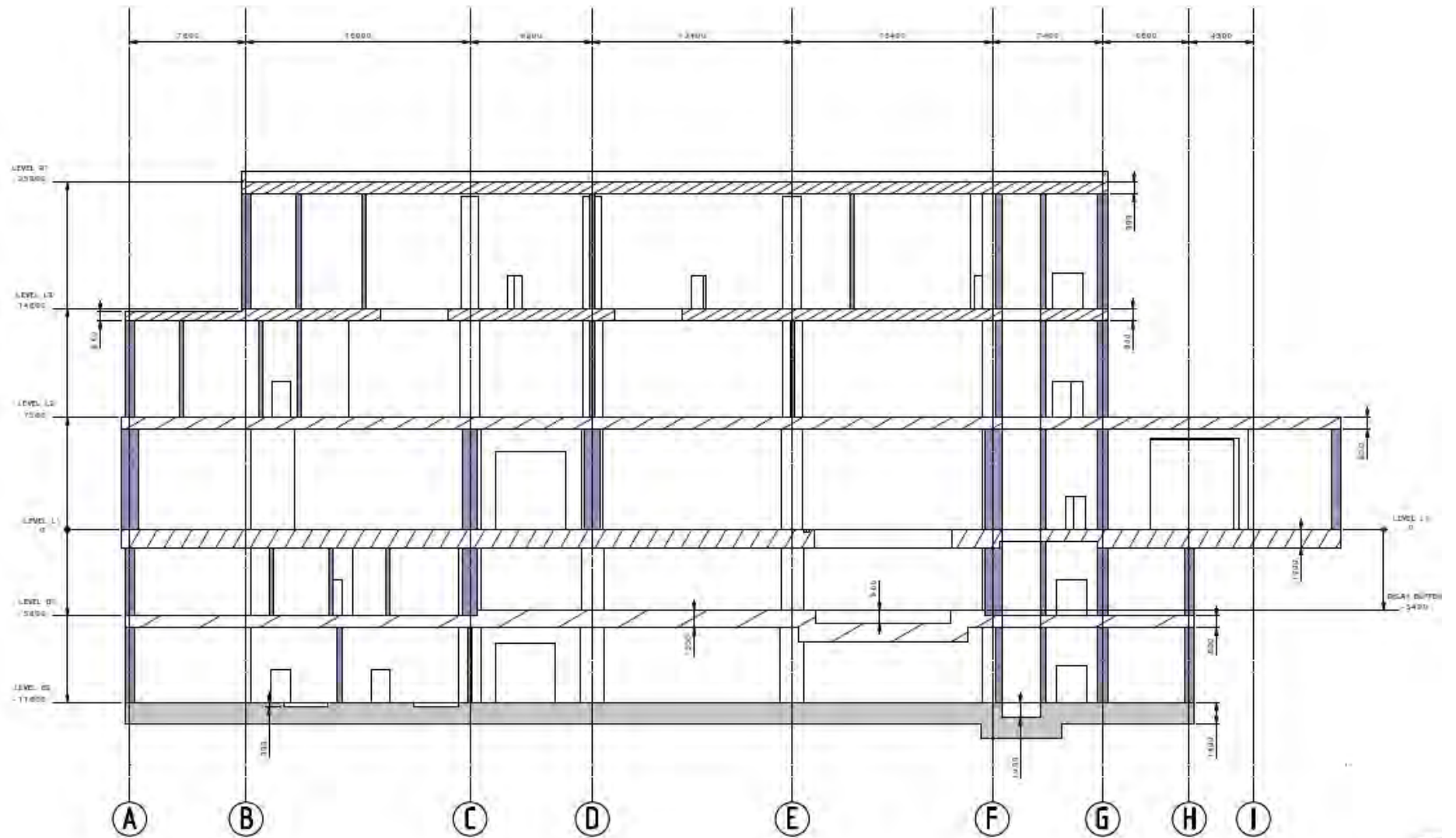
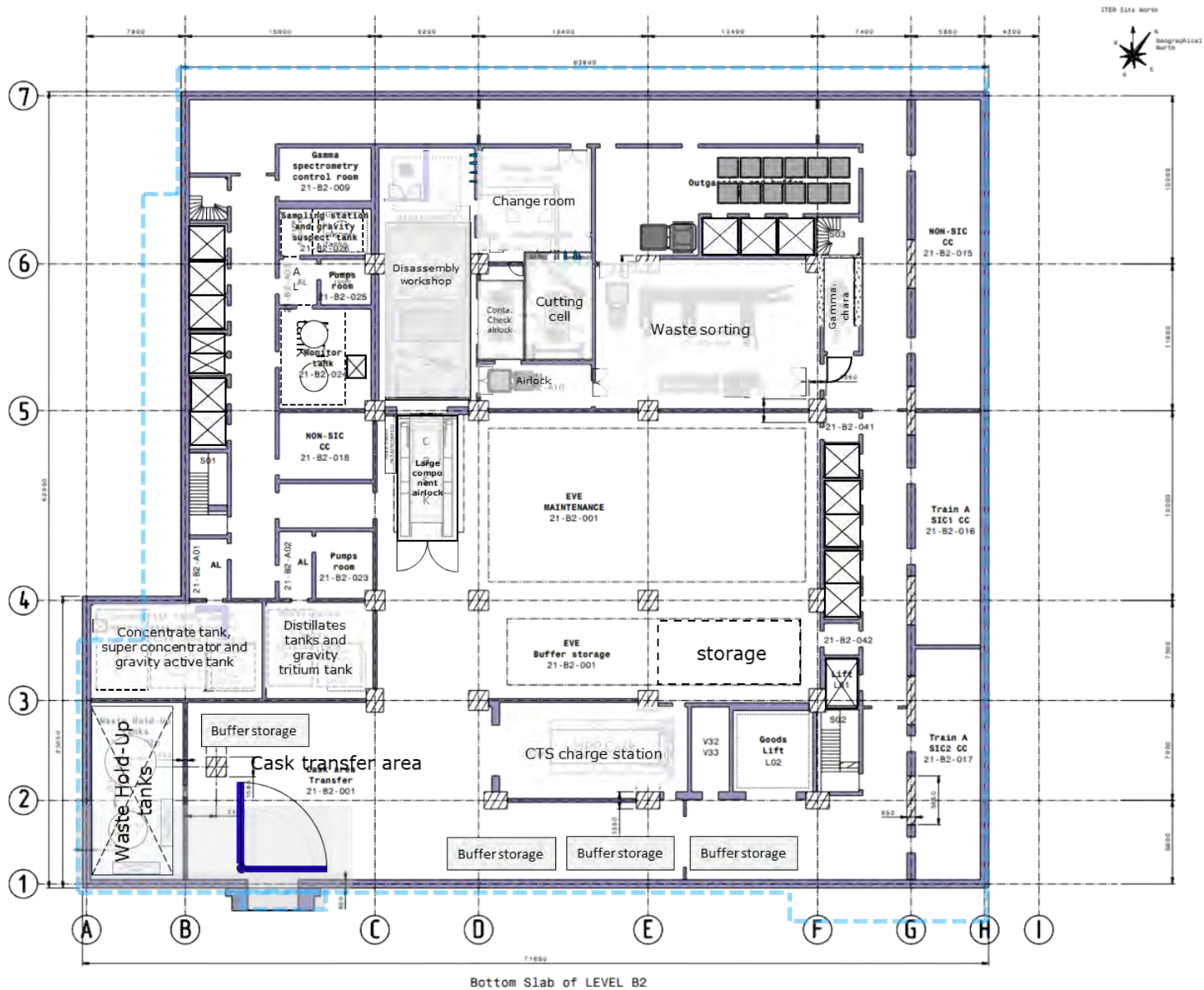
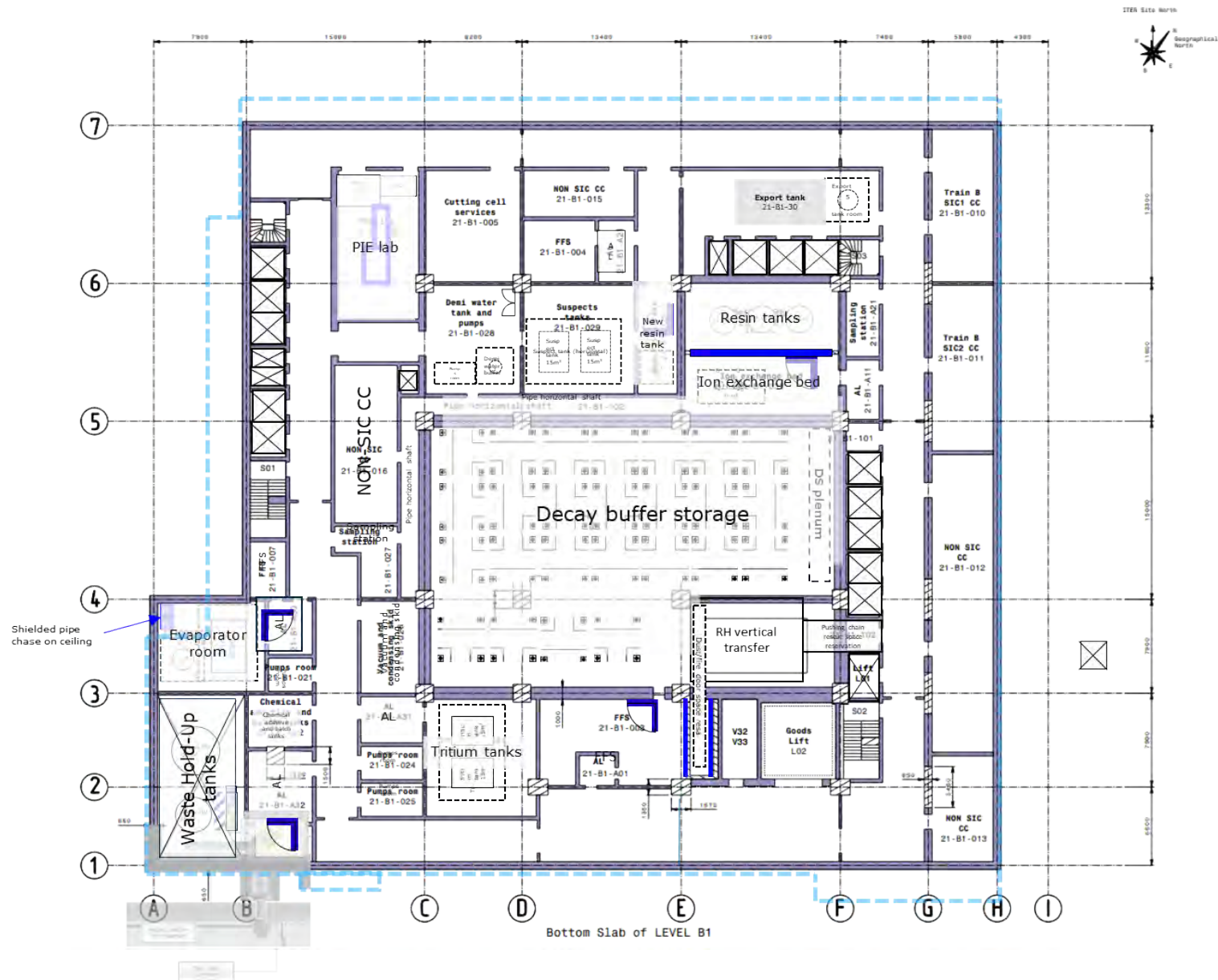
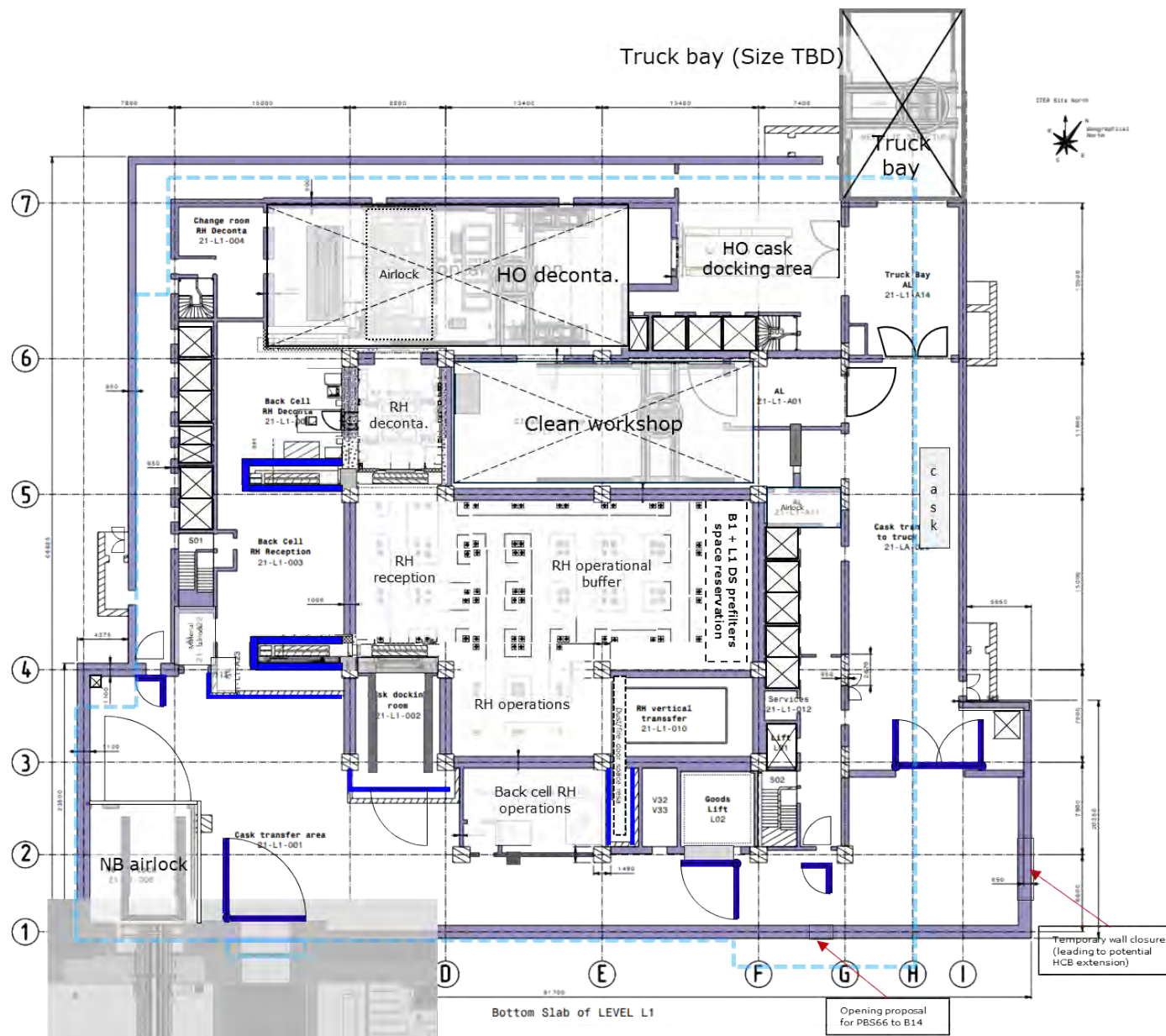
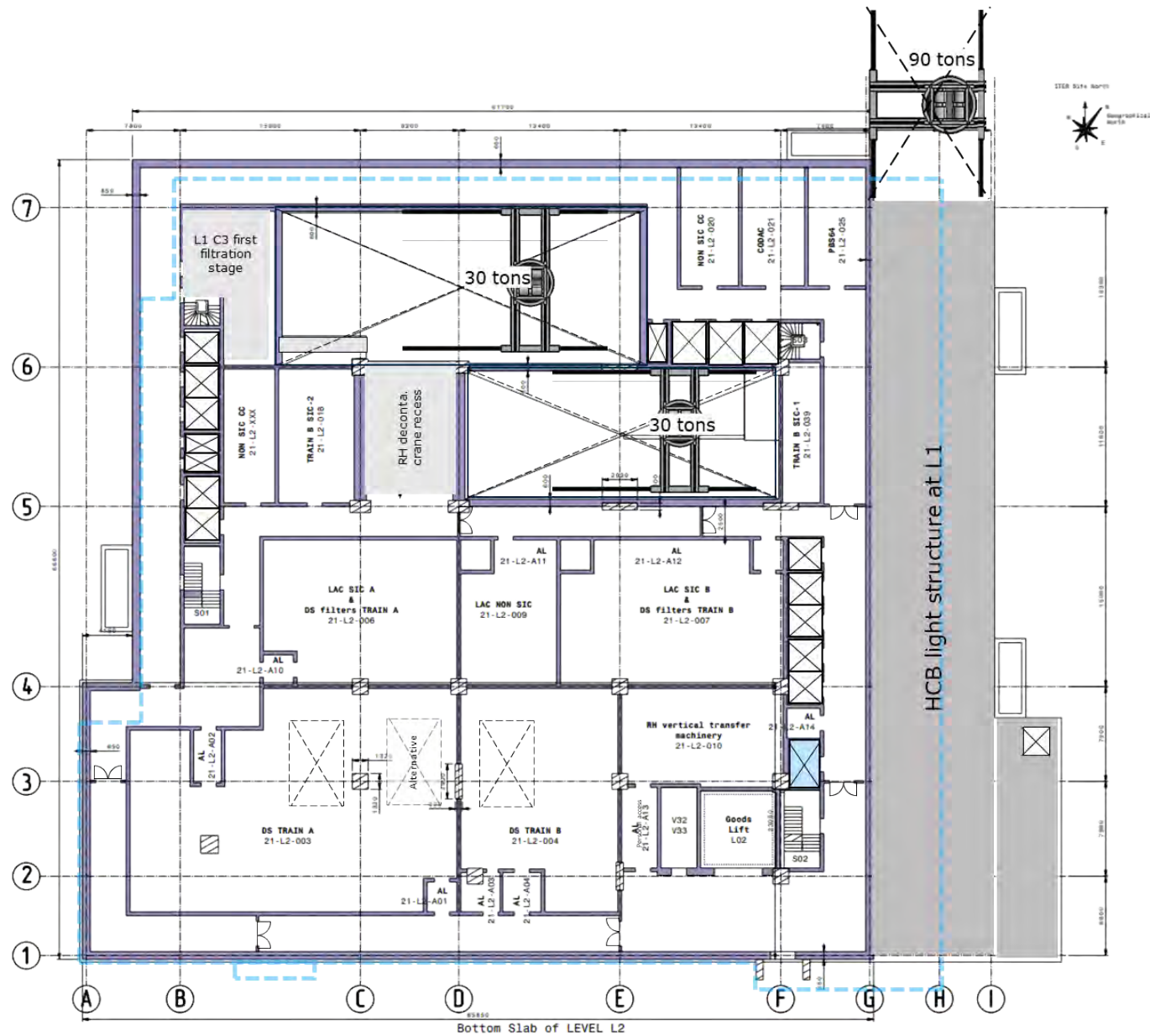


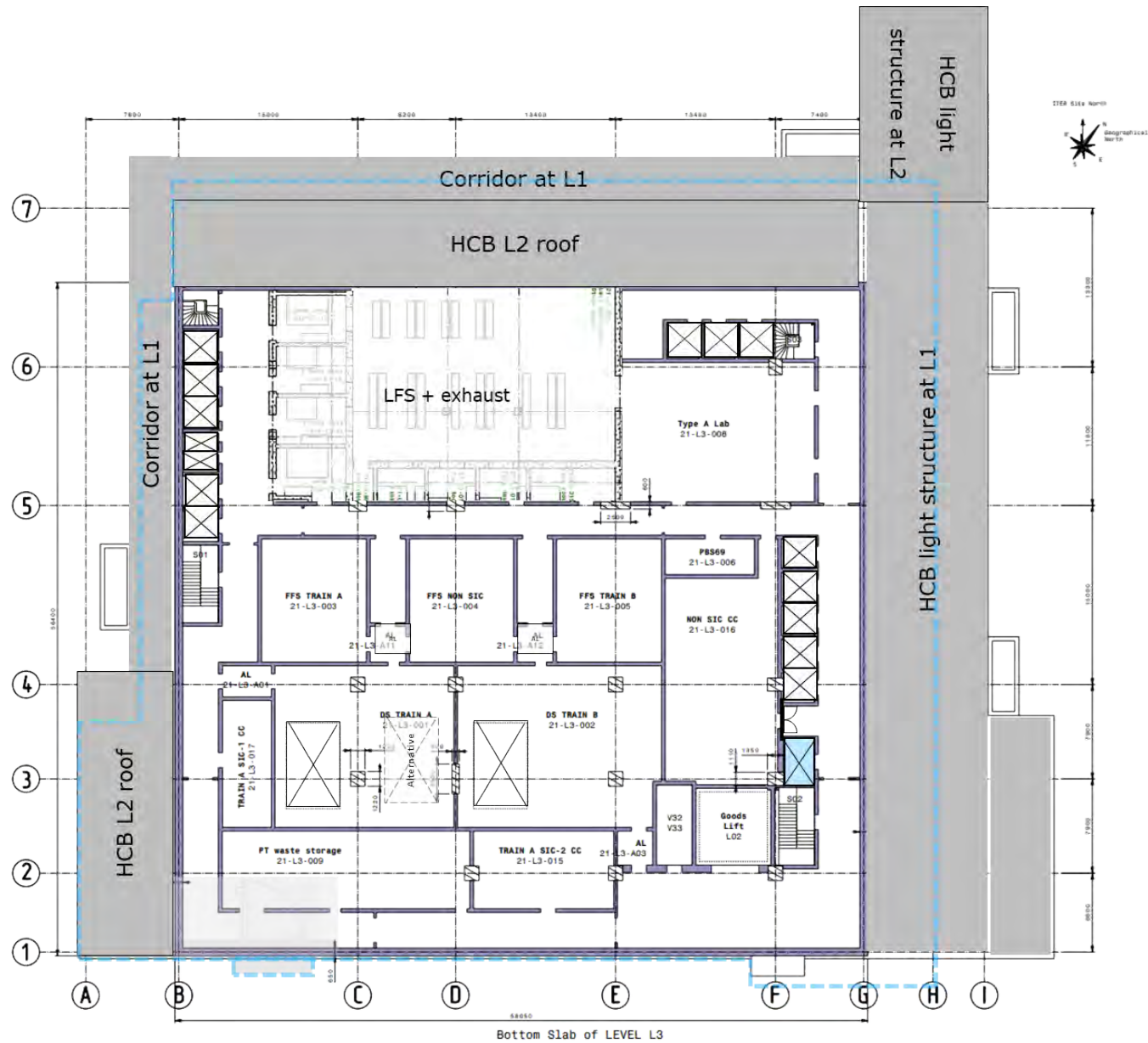
Figure 19 : Elevation view











Appendix 6: Retaining wall

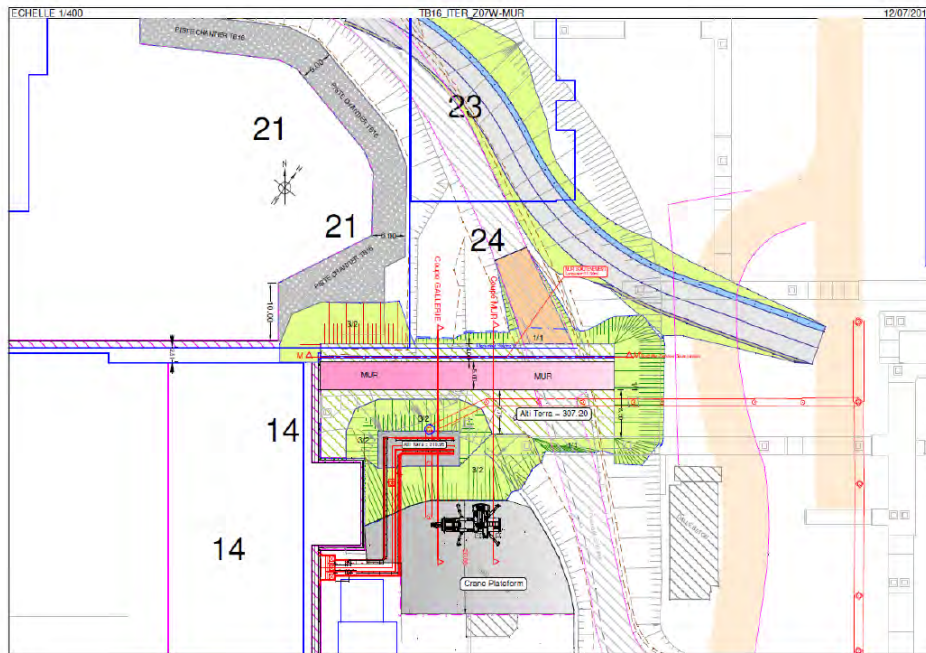


Figure: Retaining wall footprint



Figure: Retaining wall location

Nominating Domestic Agency:



| COMPANY NAME | WEB SITE link | POSTAL ADDRESS | POST CODE | CITY | COUNTRY | CONTACT PERSON | PHONE | E-MAIL | ARIBA SUPPLIER ID | COMPANY INFORMATION (if any) |
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