Study on the development schedule for the IP campus of the ILC in Kitakami

“Reference site schedule”

Tomo SANUKI (Tohoku U./Tohoku ILC Proj. Dev. Ctr.) LCWS2024 (9 Jul. 2024)

IP Campus Development (Draft 03/2016)

IP campus schedule(draft)

	Pre Preparatory Phase		Preparatory Phase				Construction Phase										
	1	2	1	2	3	4	1	2	3	4	5	6	7	8	9	10	11
legal procedures	by local Pre study		Urban Planning(development permission), Agricultural Land Act, Forest Act…														
environmental assessment	by local Pre survey		4years Research & Conservation Plan				there is some possibility to cut environmental assessment Post-project survey (depends on the development)										
site acquisition arangement	by local Land survey & arrangement																
site development	by local Pre study		Basic & Detail design				Development(depends on the site condition)										
building construction	Pre study		Basic design				Detail design		start from the usable place Construction								
surrounding infrastructure (outside of campus) by local	Pre study			Basic & Detail design			Development(depends on the site condition)										

※all include the contract procedure ※A.H. schedule is from change request NO.ILC-CR-000R

T. Onuki

Technical Detector Construction/Assembly Time Line

	Y1				Y2				Y3				Y4				Y5				Y6				Y7				Y8				Y9				Y10			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Land develop.																																								
AH					Phase-1																-2																			
DH					Civil construction																Utility																			
Yoke													Assembly on site																											
Muon																	Installation																							
Solenoid													Assembly on site											Ins.				M												
Endcap HCAL																	Ins.																							
Endcap ECAL																					Ins.																			
Barrel HCAL																									Ins.															
Barrel ECAL																										Ins.														
Tracker																																	Ins.							
QD0																																								
Commissioning																																								
Beam tuning																																								

SiD lowering

Lowering

AH ready

DH ready

AH: Assembly Hall
DH: Detector Hall
M: Field Mapping
Ins.: Installation

Karsten Buesser (LCWS2023)

ILC Detector Timeline?

	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
Status			Preparation				Construction									
Due process			Proposal		TDR											
Off-site	R&D						Sub-detector construction									
On-site (Surface)							Assembly Hall construction		Detector assembly							Commissioning
On-site (Underground)							Access tunnel, Detector Hall construction							Detector assembly		

Solenoid Manufacturing

Solenoid production

- Assumed module production in industry, assembly on site
- Transportation is an issue
- New idea: wind coil modules on-site also
  - needs to be studied in more detail
  - should fit into time lines
  - space in on-site assembly area is required
  - see talk by Y. Makida this afternoon

2020/10/23	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11
Organization	IDT		Pre-Lab.				ILC Lab.										
Status	Pre-preparation		Preparation				Construction/Commissioning										
Due process					Det. Proposal		Sub-det. TDR										
On-site (Surface)							Land devel.	Assembly hall construction									
On-site (Underground)							Detector Hall, Access tunnel construction										
Solenoid/DID	R&D TDR Bidding Assembly off-site Assembly on-site Installation Full current test																

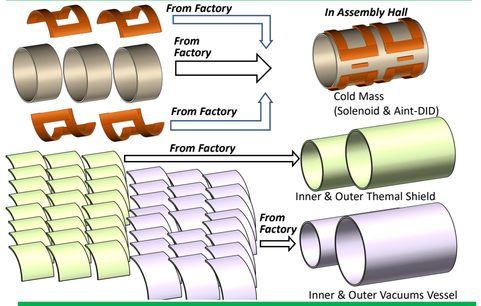
Prep. M1 M2 M3

Coil Module assembled in AH

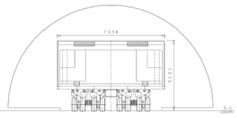
Coil winding in AH is possible

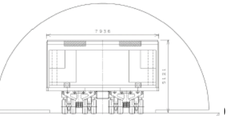
Y. Makida, ILCX

Outline of ILD Coil manufacturing process (1)



Passing Through Tunnels





Conclusions

Detector assembly has been studied in quite some detail in the past

- Check E-JADE Deliverable Report #22: https://www.e-jade.eu/publications/deliverable_reports/
- Technical schedule assumes 9 years of construction, 1 year of commissioning
  - Solenoid construction is on the critical path for the detectors
    - R&D, preparation, and construction in industry requires significant funds very early
    - to some extent already in preparatory phase

CFS and site schedules have been estimated by LCC and local experts

- Need a significant „preparatory phase“ after green light and before construction start
  - legal procedures, environmental assessment, land acquisition, etc.
    - requires already significant project funding
    - takes 4 (-6) years
- On-site assembly of detector parts can only start after Assembly Hall is ready
  - 3-4 years after construction start, 8-10 years after green light

Caveats

- Need to update knowledge about status of local planning
  - Ball has been dropped 2019
- Large uncertainties in all schedules

“Reference site schedule”
A working hypothesis of site-development schedule

Decided to create a reference working hypothesis for the study of the various on-site work in the IP area (assembly of detectors, construction of acc., etc.).

Experts from the Iwate Prefectural Government, Ichinoseki City Hall, and a construction consultancy company participated in the study.

- Characteristics of the assumed IP area (existing infrastructure, environment, etc.)
- Permissions and approvals
- CE schedule

➡Identify when on-site work related to detectors/accelerators can begin.

No guarantee. The working hypothesis that is currently considered the most accurate.

The general procedure up to construction in Japan

General procedure

- Developing an IP campus is not a special
- Can be considered similar to a typical development (e.g. the development of an industrial park).

Procedures required to construct the IP campus

1. Strategic Environmental Assessment

SEA

- **Staged** SEA is proposed by the ILC Environmental Assessment Advisory Board (KEK)
- Can start before the official implementing body is established

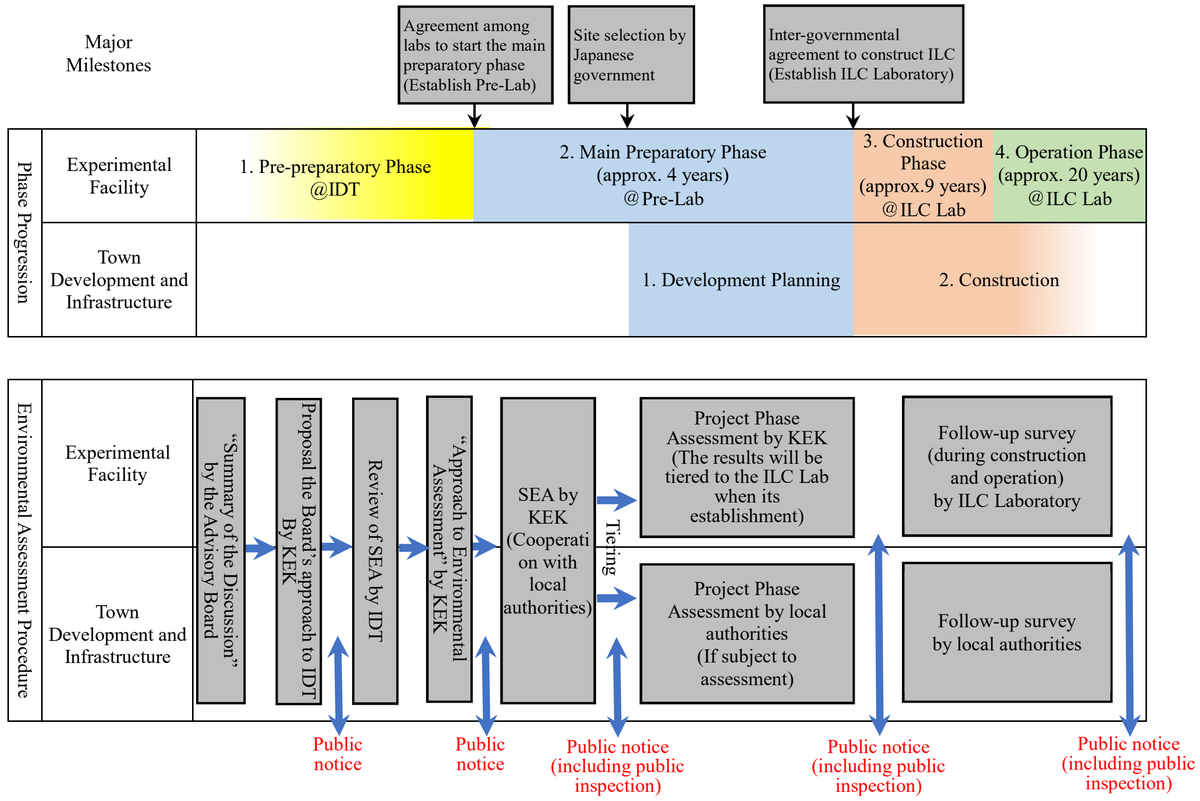


Figure 2: Procedure of Environmental Assessment for the ILC project.

ILC Environmental Assessment Advisory Board, "Strategic Environ- mental Assessment of the ILC Project - Summary of the Discussion"

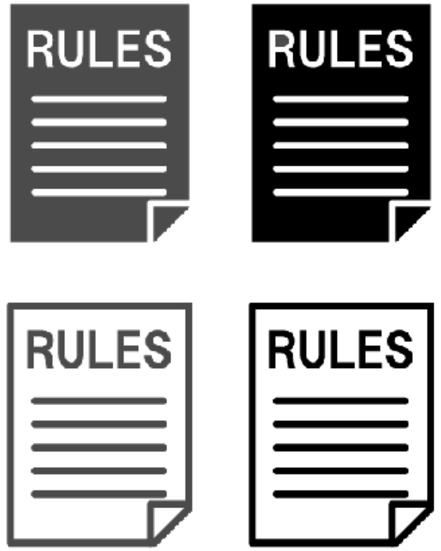
1. Strategic Environmental Assessment

SEA

- In our study, it is assumed that;
  - we will carry out a voluntary assessment (neither a legal assessment nor an ordinance assessment).
  - field surveys will require a minimum of one year for non-raptor items and **two years for raptors**. (It is important to start the raptor survey ahead of the other surveys, and proceed so that the two-year survey is completed at the same time as the other surveys.)

2. Administrative procedures -1

Toward land purchases



- City Planning Act（都市計画法）
- Act on the Development of Agricultural Promotion Areas（農振法）

  ➡Apply for the conversion of agricultural promotion areas to another use.

- Cultural Assets Preservation Act（文化財保護法）

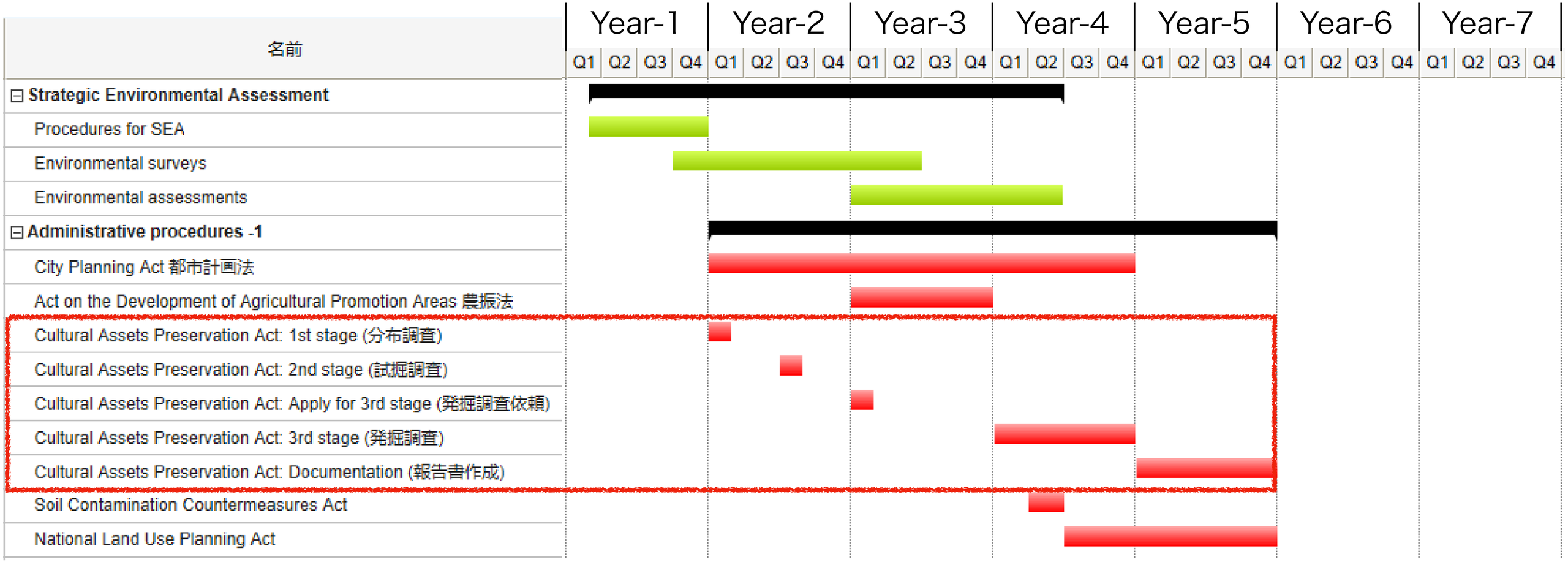
  ➡Conduct a survey and document the findings.

- Soil Contamination Countermeasures Act（土壌汚染対策法）

  ➡Notify the prefectural governor of the location and intended commencement date of the change in land characteristics.

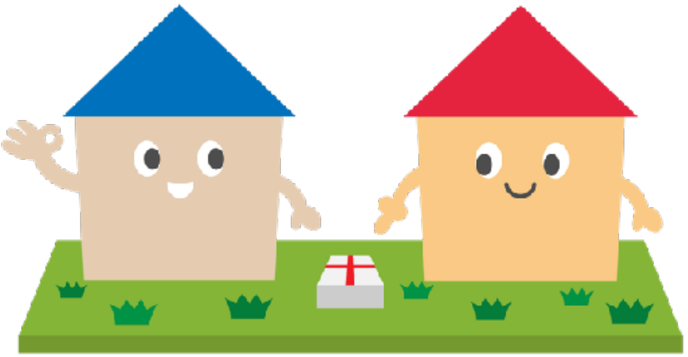
- National Land Use Planning Act（国土利用計画法）

  ➡Land purchase



Investigations of buried cultural property take a long time.

3. Surveys
Identify the landowner



- Geological survey for above-ground structures
- Topographical survey (Access road, IP campus)
- Site survey (Access road, IP campus)

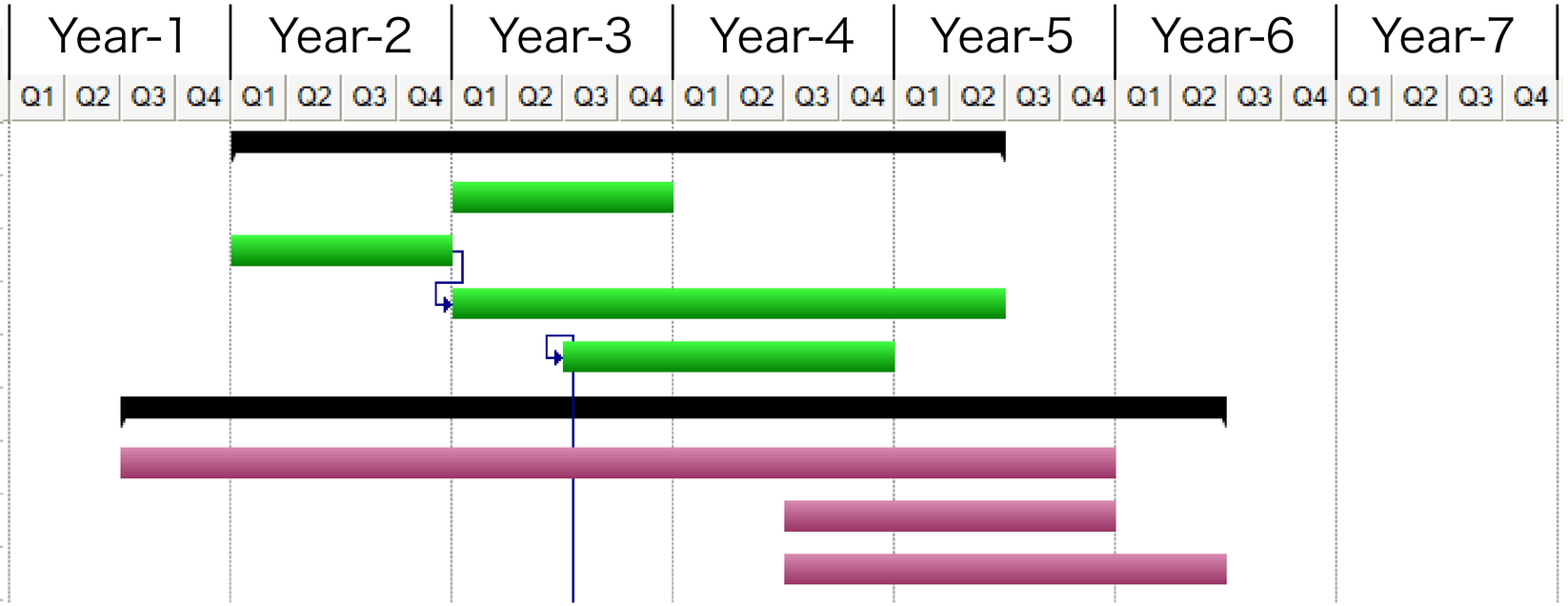
  ➡The boundary of the land parcel needs to be established.

- Guaranteed property survey (Access road, IP campus)

4. Land acquisition

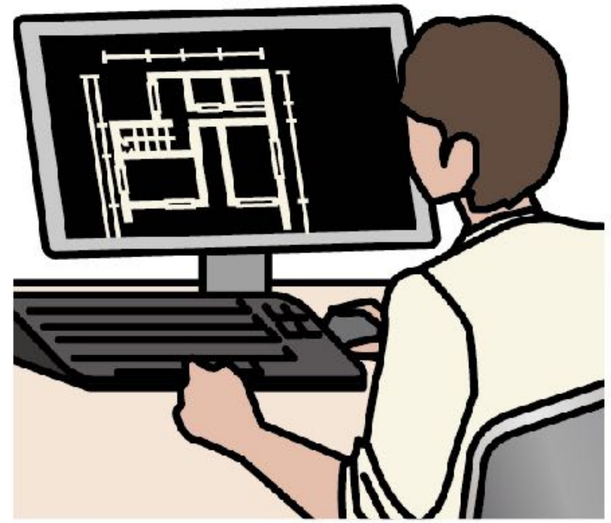
- Negotiations with landowners
- Purchase and sale agreements
- Property guarantee

名前
Survey
Geological survey
Topographical survey
Site survey
Guaranteed property survey
Land acquisition
Negotiations with landowners
Purchase and sale agreements
Property guarantee

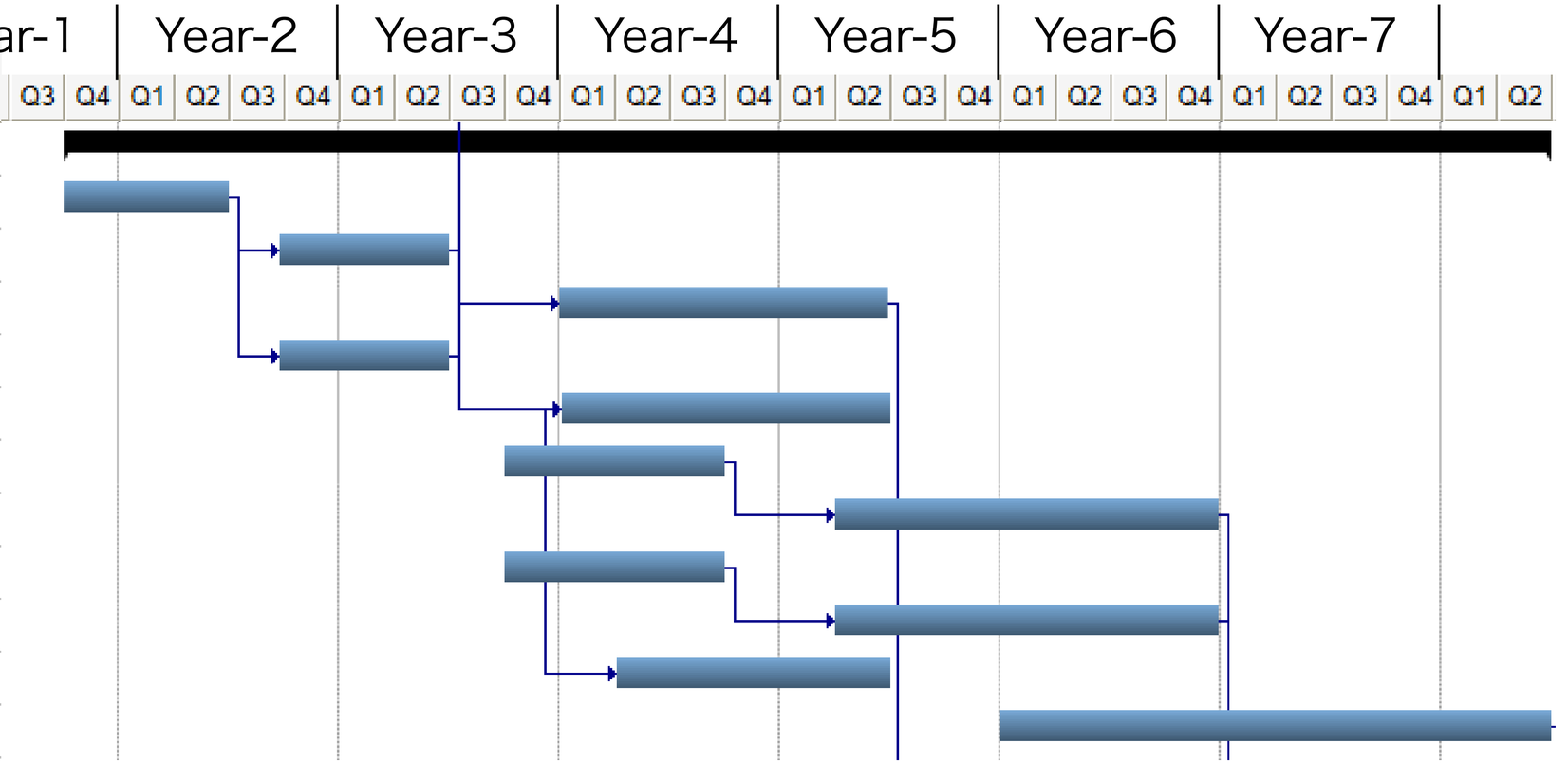


5. Planning & design

- Master plan
- Access road plan
- Infrastructure development plan
- Design of shafts
- Building plan



名前
Planning & design
Master plan
Access road (2 way) Basic Plan
Access road basic / implementation design
Infrastructure development Basic plan
Infrastructure development basic / implementation design
Vertical Shaft basic plan
Vertical Shaft basic / implementation design
Assembly Hall basic plan
Assembly Hall basic / implementation design
Buildings basic plan
Buildings basic / implementation design



6. Administrative procedures -2
Toward construction

- Landscape Act（景観法）

  ➡Notify the head of the relevant Landscape Administration Body of the type, place, design, construction method, and scheduled date of the commencement of the action.

- City Planning Act（都市計画法）

  ➡Apply for development permission / when complete the relevant development, notify the prefectural governors

- Forest Act（森林法）

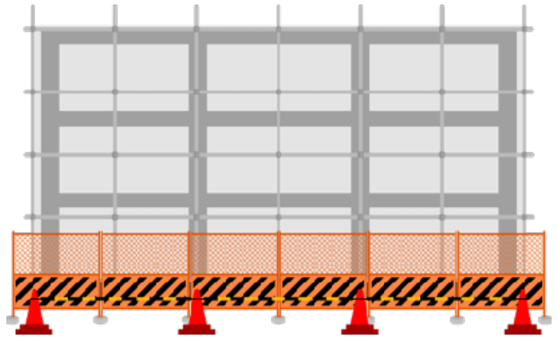
  ➡Apply for permission to develop forest area

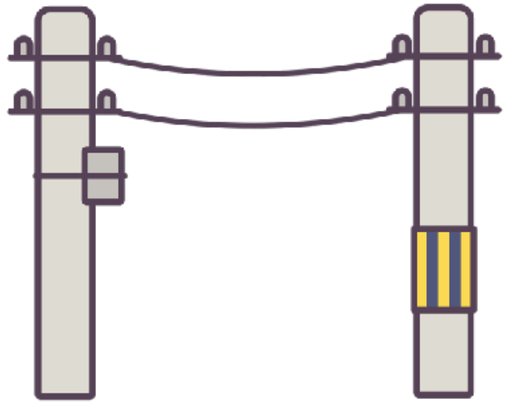
- Apply for building permit（建築確認申請）

Construction

7. Construction

- Access roads
- Infrastructure development
- Tunnels (shafts)
- **Assembly Hall** / Buildings
- Water supply works
- Electrical/telecommunications works





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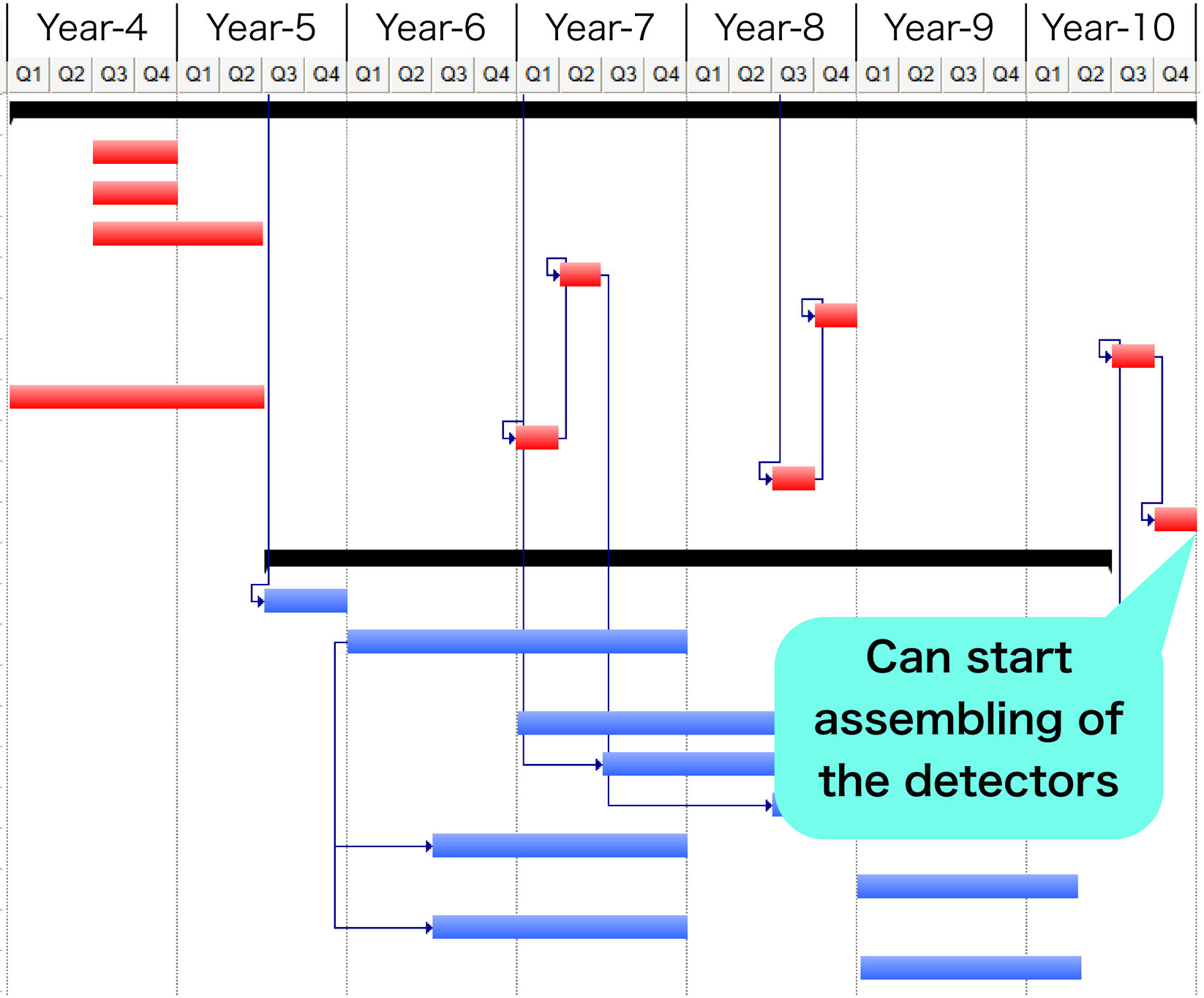
Construction

Receive an endorsement that people can survive in the building.

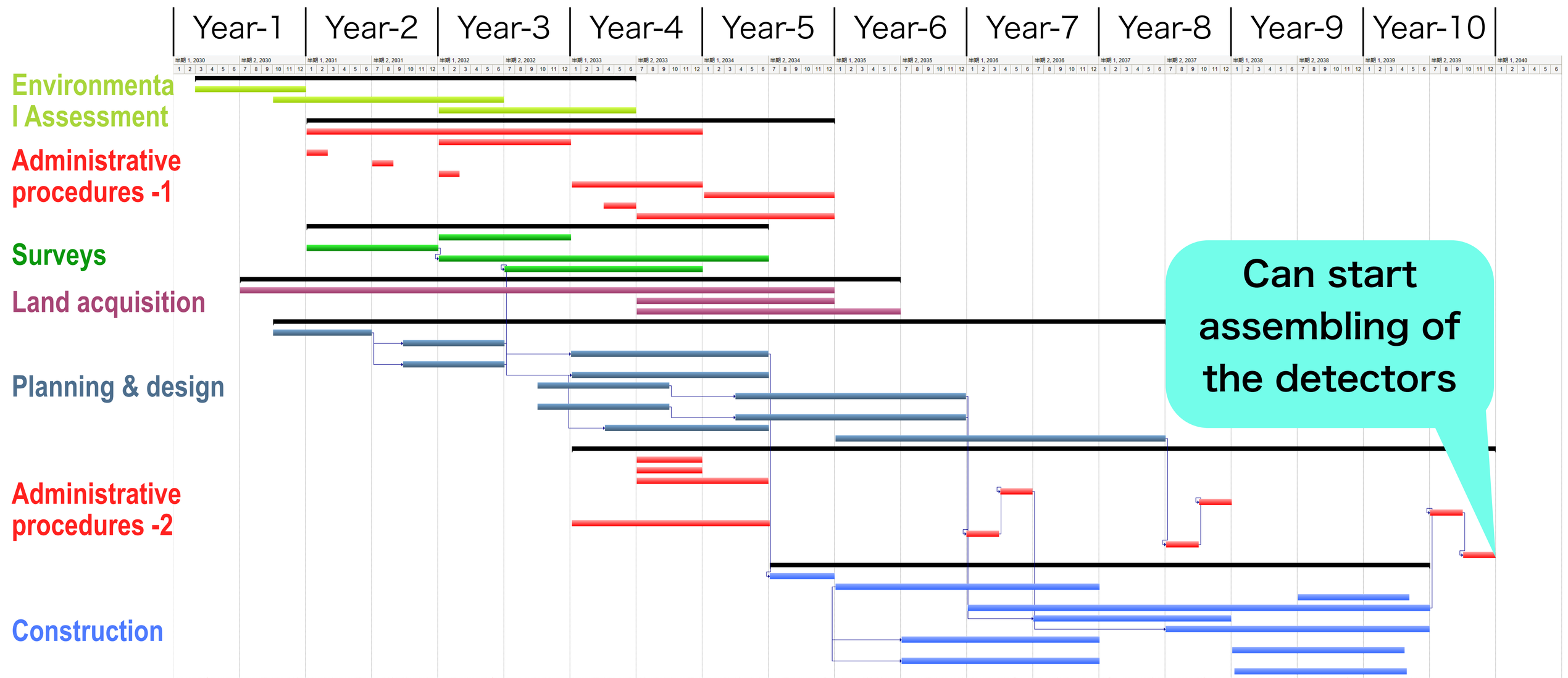
名前
Administrative procedures -2
Landscape Act
City Planning Act: 事前協議/届け出
City Planning Act: 事前協議/32条/29条
City Planning Act: Article 37(AH)
City Planning Act: Article 37 (Others)
City Planning Act: Article 36 (一期完了検査/部分完了)
Forest law 森林法（林地開発許可）：事前協議/本申請
Building permits: 建築確認申請: 申請 (AH)
Building permits: 建築確認申請: 申請 (Others)
Building permits: 建築確認申請: 検査 (AH)
Construction
工事発注手続き
Access road: (temporary works)
Access road: (finishing works)
Infrastructure development: 造成・基盤（ASH関連：一期工事）
Vertical Shaft
Assembly Hall
Water supply: Outside IP Campus
Water supply: Inside IP Campus
Electrical (HV) / telecommunications: Outside IP Campus
Electrical (HV) / telecommunications: Inside IP Campus



Summary:
“Reference site schedule”

A reference working hypothesis for the study
of the various on-site work in the IP area

No guarantee. The working hypothesis that is currently considered the most accurate.



Can start detector assembling,

10 years after the start of **the environmental assessment**.

5.5 years after the start of **civil works**.

No guarantee. The working hypothesis that is currently considered the most accurate.