NZTA Z03:2025

Physical Works Schedule Standard

NZ TRANSPORT AGENCY
WAKA KOTAHI

Te Kāwanatanga o Aotearoa
New Zealand Government

1. Introduction

The Z03 Physical Works Schedule Standard sets out the scheduling requirements which Contractors engaged by NZTA must meet to ensure that schedules are developed to an acceptable standard.

2. Supporting Guidelines

Below is a list of supporting guidelines which were used to develop the Standard. These can be referred to.

a) (PMBOK® Guide) – Current Edition.

b) Society of Construction Law Delay and Disruption Protocol – Current Edition.

3. Applicability

This Standard has been developed to foster a consistent approach to schedule management across NZTA and its physical works and contracts.

a) The entirety of this Standard is mandatory for all capital works projects with a contract value over $20 million.

b) Only Section 4 of this Standard is mandatory for capital works projects with a contract value under $20 million.

Schedule shall mean Programme or Comprehensive Programme (as applicable under the relevant contract) throughout this Standard.

Capitalised terms have the meaning given in the relevant contract unless defined in this Standard.

4. General Requirements

The Schedule will include all known works, activities, and efforts necessary to complete the Contract Works.

4.1 Software Specifications

4.1.1 Required Software

The Schedule must be issued in a format compatible with Primavera 6 and usable with NZTAs' version of Primavera 6.

4.1.2 Schedule Submission Formats

The Schedule must be issued to NZTA as a native Primavera P6 or Microsoft Project file.

In addition, a time-scaled bar-chart plot of the Schedule in "PDF" file format must be submitted containing the following columns as minimum:

a) Activity ID;

b) Activity Name;

c) Original Duration;

d) Remaining Duration;

e) Early Start;

f) Early Finish;

g) Baseline Start;

h) Baseline Finish;

i) Total Float;

j) Critical (“Yes” or “No”);

k) Line Numbers.

4.2 Basis of Schedule

All Schedule submissions will include a supporting Basis of Schedule document. The Basis of Schedule must include:

a) Key assumptions used to develop the Schedule;

b) List of exclusions.

c) List of all documents used to prepare the Schedule;

d) All calendar allowances;

e) Table of resources used, including associated coding and productivity / utilisation assumptions and limits;

f) Summary of time risk allowances (Contractor contingencies);

g) Logic used to validate the critical path;

h) Key Constraints;

i) Identification of all third-party interface points as milestones;

j) 14 Point DCMA report;

k) All resource and task calendars used to develop the Schedule;

l) Proposed progress measurement methodology;

m) Any other information deemed necessary;

n) Any long lead procurement items.

4.3 Level of Detail

Any Schedule will be composed of respective detailed activities logically tied together. A Schedule, activity or milestone will have the following attributes:

a) Contain in respect of activity duration a description to enable measurement of the physical % within the required update period.

b) Be displayed in red in the Gantt Chart if on the critical path.

c) A description that explains and represents the performance of the activity, including tangible deliverables or products.

d) Will remain the same and shall not be changed or reassigned a different activity ID number.

e) Be logically tied to other activities in the Schedule.

f) Contract start and end milestones.

g) Separable Portion and defects liability milestones where applicable.

h) If an interface point in the Schedule, be coded as a milestone.

i) Be assigned to an appropriately defined calendar.

4.4 Critical Path

4.4.1 General Critical Path Requirements

a) The critical path/s will be clearly displayed on any submitted Schedule in red.

b) The critical path/s will be end-to-end and continuous.

c) Activities on the critical path/s will not have durations longer than one reporting period as far as practicable.

d) The critical path/s will be activities with ‘zero float’

e) The Schedule will not include negative float.

4.5 Retained Logic and Scheduling Practices

The following practices must be used at any time during the setup and maintenance of a Schedule:

4.5.1 Scheduling Methodology

Programmes will be scheduled using Retained Logic.

4.5.2 Float Calculation

Float will be calculated using the longest path method.

4.5.3 Lag Calculation

Lags will be calculated based on successor dependencies.

4.5.4 Constraint Application

Hard constraints will be used to represent absolute dependencies.

4.5.5 Late Starts

Late start dates will be calculated based on logical relationships and resource availability.

5. Baseline Schedule

5.1 Baseline Schedule Reconciliation

5.1.1 Schedule Meeting

Following award of the respective contract and before commencement of the Contract Works, the Contractor shall convene a scheduling meeting with NZTA to discuss the Contractors overall plan to accomplish the work; the detail work plan for the complete project; scheduling information, project specific requirements, and other key issues necessary for the preparation, maintenance, and submittal of the Schedule.

5.1.2 Baseline Schedule Development

The Schedule submitted by a Contractor must be produced in accordance with the Contract and this Standard, and will become the Baseline Schedule.

5.1.3 Schedule Integrity Requirements

The Schedule must meet the following integrity requirements:

a) Undertake a DCMA schedule integrity check.

b) Activities or milestones will not be locked into a position in time by a constraint mechanism that forces their total float to be always zero.

c) Negative lags will not be used.

d) Long lags will not be used. (longer than reporting period).

e) The Schedule will not include any out-of-sequence activities.

f) No later than 20 Working Days after commencement of the Contract Works, the Contractor will transfer status information from any parallel Schedule file to the Baseline Schedule.

5.2 Work Breakdown Structure

5.2.1 Requirement for Work Breakdown Structure (WBS)

a) The Baseline Schedule shall contain a WBS developed to work package level.

b) The Cost Breakdown Structure (CBS) shall be interfaced with the coding structure within the WBS to allow reporting of cost and Schedule.

5.3 Schedule Activities

5.3.1 Level of Detail

The Baseline Schedule will be developed up to the lowest practical level possible with the information available and will be composed of respective detailed activities logically tied together. A detailed activity shall have the attributes identified in this standard's general requirements in addition to those outlined in this section.

5.3.2 Activity Description

a) Each detailed activity shall be described in sufficient detail as to fully describe the work to be performed based on information available at the time.

b) The Contractor will not use generic terms or descriptions.

c) Hammock (Level of Effort) type activities shall be clearly identified and indicated.

d) The description of each detailed activity in the Baseline Schedule shall remain the same and shall not be changed.

e) In the event a change to activity descriptions is required, the Contractor will complete and submit a baseline change log with the project updates to NZTA.

5.3.3 Activity Relationships (Logic Sequences)

a) All preceding and succeeding event activity ID numbers, associated relationship types, and lag values will be identified for each detailed activity to form a single Schedule network.

b) Excluding continuous activities, no activity should be longer than 20 Working Days.

c) Except for a single works start and single works completion date, the Contractor shall not use open ends.

d) All other detailed activities must have logical predecessors and successors to properly define their relationships to the other detailed activities within the Schedule network.

e) The Contractor will not use finish to start relationships with positive lags.

f) Any revisions to any baseline logic affecting the critical path, near critical paths, or other major Schedule paths will be described in detail in the Contractor's status reporting.

5.3.4 Calendar/Planning Units

a) Calendars shall be clearly labelled and identified.

b) All planned workdays shall be explicitly marked.

c) All non-workdays shall be clearly indicated.

d) All weather allowances will be included.

e) Planning units shall be expressed in days, providing a uniform and easily understandable measure for scheduling, and tracking progress.

5.3.5 Key Dates

a) The Baseline Schedule will identify as a minimum all the key dates as specified in the Contract.

b) The Contractor will incorporate requested client milestones.

5.3.6 Division of Responsibility

a) Divisions of responsibility will be clearly identified on the Contractor's Schedule in the scope of work.

5.3.7 Resource Loading

a) The Contractor will resource load all physical work activities in the Baseline Schedule represented in man-hours.

b) All resource loading will be levelled, taking into consideration maximum productivity.

c) All Contractor resource loading will be issued to NZTA for progress tracking.

5.3.8 Activity Codes, Work Codes, Enterprise Codes and Work Breakdown Code

a) The Contractor will provide and populate a unique set of coding fields. NZTA can use these code fields to group, sort, divide, separate, account, distinguish, and filter all the detailed activities in the Schedule.

b) The Contractor must also ensure that a common set of activity codes are properly assigned to all detailed activities in the Baseline Schedule.

c) The Contractor or NZTA may add activity codes to work tasks for the sole purpose of Schedule presentation, uniformity, and clarity.

5.3.9 Scheduling of deliverables & Receivables

The Contractor will ensure the necessary deliverables and receivables are identified clearly in conjunction with NZTA and incorporated into the Baseline Schedule.

6. Monitoring and Controlling of the Schedule

6.1 Baseline Control

6.1.1 Progress measurement

The Baseline Schedule, or subsequent revisions shall be used to measure and evaluate all contemporaneous Schedule progress.

6.1.2 Schedule revisions

All subsequent Baseline Schedule revisions must be:

a) Assigned a sequential number; and

b) Have the Schedule files preserved for future reference; and

c) Replace the prior Baseline Schedule revision; and

d) Used to measure progress going forward; and

e) In accordance with the Contract.

6.1.3 Schedule Updates

Updates of the Baseline Schedule:

a) Will show the actual progress and data date of the work compared to the Baseline Schedule

b) Will incorporate actual start and finish dates; current physical percent completion; current remaining durations; and predecessor and successor logic revisions.

c) Will incorporate revisions to quantities, resources, and calendars.

6.2 Physical Percent Complete

a) Where practical, detailed activities must be progressed by using physical percentage completed.

b) Physical percentage completed will be calculated based on actual progress as measured by work effort or by measurable and verifiable material quantities (commodities).

c) The Contractor will provide information to validate methods used to develop physical percent complete.

d) In no case will physical percent complete be based solely on remaining durations compared to original durations or actual expenditures compared to budgeted expenditures.

e) All significant reductions in physical percentage completed will be reported in the Contractor's status report along with a detailed explanation.

6.3 Remaining Durations

a) Remaining durations shall represent the Contractor's best estimate of the time for completion of each detailed activity.

b) Remaining durations shall be based upon then-current or known factors.

c) The Contractor will not base the remaining durations on percentage completed or an automated countdown process.

d) Changes in the remaining durations greater than 20 working days will be reported in the Contractor's progress report along with a detailed explanation.

6.4 Actual Start and Finish Dates

Actual start and finish dates shall be evidenced by supporting documentation.

6.5 Activity Relationship Sequence Changes

6.5.1 Reassessment of Activity Relationships

The Contractor will revise the Schedule logic when activities are reported as being out of sequence.

6.5.2 Documentation of Activity Relationship Revisions

The Contractor will capture all changes in activity relationships and logic sequences. Including:

a) Description of the change.

b) Reason for the change.

c) Impact on the Schedule.

d) Revised activity dates and durations (if applicable.)

e) Updated dependencies and relationships.

6.5.3 Provision of Justification

The Contractor will provide clear justification for the changes made to the activity relationships.

6.6 Calendar ID/Planning Unit Changes

The Contractor will report all changes made to calendars or calendar designations used for respective detailed activities in the Contractors' progress report along with an explanation regarding such changes.

6.7 Schedule Code and Work Breakdown Structure Changes

Any necessary revisions to the Schedule task codes will be reported in the Contractor's progress report along with an explanation.

6.8 Schedule Recovery Plan and Delays

A Schedule recovery plan will be produced to address deviations from the Baseline Schedule. It will contain the following information.

6.8.1 Root Cause Analysis

A Schedule recovery plan will contain a root cause report containing the following:

a) A detailed analysis identifying the underlying causes of the project deviation or issue.

b) A clear explanation of the events, actions, or inactions that led to the deviation.

c) Identification of contributing factors, such as scope changes, design errors, or resource constraints

6.8.2 Delays

Delays will be evaluated as they happen, using the most up-to-date project Schedule.

6.8.3 Baseline Schedule vs. Proposed Remedial Actions

A Schedule recovery plan will contain a Baseline Schedule vs. Remedial Action report containing the following:

a) A comparative analysis showing the original Baseline Schedule (project schedule and cost) against the proposed remedial actions.

b) A detailed breakdown of the changes required to get the project back on track, including:

- Revised project Schedule
- Updated resource allocation
- Cost adjustments
- A clear explanation of how the proposed remedial actions will address the root causes and mitigate future risks.

6.8.4 Other Inclusions

The remedial plan will additionally contain the following:

a) Corrective Actions: Specific steps to correct the deviation or issue.

b) Preventive Actions: Measures to prevent similar deviations or issues from occurring in the future.

c) Risk Management: Identification and assessment of potential risks associated with the remedial actions.

d) Resource Allocation: Reallocation of resources (e.g., personnel, materials, equipment) to support the remedial actions.

7. Schedule Reporting

7.1 General Progress Reporting

7.1.1 Schedule Report Contents

Progress reports submitted by the Contractor will contain the following Schedule information:

a) A four week look-ahead Schedule.

b) An assessment of all areas of concern relating to the Schedule.

c) A float path analysis.

d) Number of lost days in the period.

e) Record of all delays and impact to the critical path.

f) A list of all Instructions and Decisions received by the Contractor to date as they relate to the Schedule.

g) A list of all notified Variations, proposed Variations and their statuses as they relate to the Schedule.

h) S-Curve for the overall progress of the Schedule showing Baseline Schedule vs actual and forecast percentage complete.

i) Histograms showing Baseline Schedule vs actual and forecast utilisations are at or below maximum allowances and levelled.

j) DCMA Schedule integrity check.

7.1.2 Schedule Report Format

Schedule reports are to be issued in the native file format. Alongside the native file the Contractor is to provide a:

a) PDF copy of the updated Schedule showing all activities, expanded fully.

b) PDF copy of the updated Schedule filtered showing only the critical path/s.

c) PDF copy of the updated Schedule at summary level indicated major milestones.

d) PDF copy of the updated Schedule filtered to show the 4-week look ahead.

e) All PDF copies of the updated Schedule shall contain the following details as a minimum:

- Activity ID.
- Activity Name.
- Activity At Complete Duration.
- Start.
- Baseline Start.
- Finish.
- Baseline Finish.
- Baseline Finish Variance.
- Physical Percent Complete.
- Critical (“Yes” or “No”).
- Total Float.

7.2 Earned Value Reports

7.2.1 Earned Value Methodology

When required by the respective contract the following earned value methodology requirements will be followed:

a) The Contractor's progress measurement system shall be developed from the Baseline Schedule.

b) All Schedule progress reports will contain all earned metrics.

c) The report will show planned versus installed quantities for materials.