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The Times

October 2013

A journal of transport timetable history and analysis

How They Brought the Good News from Aix to Gladys



**Inside: The making of a timetable 2013
Timetables in the Bibliothèque Nationale
Serving West and North Hobart**

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Editor, The Times Geoff Lambert 179 Sydney Rd FAIRLIGHT 2094 NSW G.Lambert@iinet.com.au
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Feedback

The Massachusetts Bay Transportation Authority (MBTA), based in Boston, launched a design competition for a new 'tube map' for their public transport system. You can view (and, until 20 September, vote on,) the various submissions at: <http://s.zoomerang.com/s/mbtamapsurvey> It's interesting how the same system can be drawn in so many completely different ways (3 entries, below). **Brendan Whyte**

I enjoyed your articles in latest Times. I read a lot of sci-fi in my younger years and I've never forgotten A subway named Mo-bius! I was very interested in The man who never returned and the history of the song. The tune - and an adaptation of the words - was revived in 1979 by a Perth bluegrass group "Turkey Sweat" who issued a 45rpm called The Great 1979 Train Robbery (Trad. arr Hitchins). The record was produced by Shelter Recording Studios for Friends of the Railways and it was a protest against the then Charles Court Liberal Government closing the Perth - Fremantle suburban service. Of course the Premier's name fitted the song perfectly, it ending with a "Poor old Charlie". The B side was a bluegrass tune called Fiddlers blues (York). Needless to say the record never appeared on Perth's charts and I've no idea how many copies were sold to aid the Friends of the Railways funds. I've got two copies.—**David Whiteford**

I have another entrant for your occasional series on famous people who liked timetables. I have been reading "Amazing and Extraordinary Facts – Prime Ministers" by Jonathan Bastable, published by David and Charles, about British PMs. In the Kindle edition, at location 1063, it says "Stanley Baldwin was very fond of trains. He studied timetables for fun." This is consistent with his father and him both being Directors of the Great Western Railway.—**Victor Isaacs**



The making of a timetable

How Gladys got the good news
by **GEOFF LAMBERT**

Timetables are like sausages: it is best not to see them being made—Bismarck



IT WAS THE MOST CLOSELY-watched timetable of all time and certainly the first to be leaked to the public as a Working Time Table via a newspaper web-site (<http://images.smh.com.au/file/2013/05/16/4277920/timetable.pdf?rand=1368718577114>). The blog associated with the web-site attracted 218 responses by 4PM on its first day—none of the commentators admitted to being AATTC members. None of them were happy.

The Taking of Pelham 123

The genesis of this timetable goes back to the O'Farrell Government's decision to split up RailCorp into Sydney Trains and NSW Trains— or further back than that, really. Timetabling on the state railways in NSW had always, naturally enough, been carried out by the railway itself (see table, below). That is the way it is done all over the world. It is not the way that it is done in NSW now.

A long-standing distrust between the State Government's "Transport for NSW" and RailCorp flared into open warfare after the fall of the Labor Government. One of the first moves made by the Minister Berejik-

lian was to wrest timetable compilation away from RailCorp and settle it into her own Department. This happened about a year after the election and Version 3.42 of the 2010 SWTT, which was printed on 20-April-2012, was the first to bear the new logo (old and new, below). The names on the cover of this timetable were John Karaboulis and Tony Eid from TfNSW's "Service and Procurement Section" and RailCorp's existing "Service Delivery Group", respectively. RailCorp's old "Timetable Development & Program" group had vanished from the SWTT.

Macquarie St gossip had it that these decisions had their origin in two factions of the Government— The Premier (Fatty O'Barrel) camp with allies in TfNSW and the Want-to-be-Premier camp consisting of Mike Baird and Gladys Berejiklian with allies in RailCorp. In this internecine warfare, Gladys couldn't take a trick. She was rolled on the N.W. Rail Link (which she wanted to be heavy rail). The timetable development process is a another example.

At this time, the SWTT production was already unusual in that a substantially "new" timetable had not been issued for 18 months— the usual "inter-issue" gap had been 12 months for many years, with the new SWTT being issued in October each year. Other railways with which RailCorp interacted—most notably ARTC—synchronized their own "new" timetables with this calendar. TfNSW decided to put back the introduction of its own "new" timetable for a further year— that is, to October 2013.

In the bad old RailCorp days timetables were built by the "Train Planning" Section. This seems to have been quite an opera-

tion. Judging from the small sample of Train Planning documents that have fallen into my hands, there must be many hundreds of them. It is worth noting that RailCorp (or at least its predecessors) had an *Australian Rail Training* "school" (at Burwood signal box?) in which students could take an extensive course and sit a rigorous exam on Train Timetabling— among many other things. I have copies of their course materials.

It is unclear how many of the old RailCorp timetabling staff were seconded to TfNSW, but it is known that TfNSW felt the need to bring in outsiders as well. One of these was Chris Sparrius who was head-hunted from Metro Trains in Melbourne.

Mr. Sparrius and Tony Giles from TfNSW presented an enlightening seminar, "The Art of Train Timetabling", to the Railway Technical Society (RTSA), NSW Division at Central Station in August 2012. A report of the main features of this presentation can be found in Table Talk of September 2012. I was hopeful that the full presentation would become available via RTSA but, on enquiring about this, I was told- "Only after it has been sanitized". What this might have meant is a subject for speculation, but the presentation did seem to imply that the RailCorp way of making timetables was not approved of. Most of the attendees at this meeting, I think it fair to say, were scornful of the presenters. I was not. I was impressed that Mr Sparrius, in particular, was very cognizant of the principles of building a timetable from scratch.



Transport
RailCorp



Transport
for NSW

Who made the timetables? (incomplete)

Years	Organisation	"Department(s)"
1890s	New South Wales Railways	Chief Traffic Manager
1910s	New South Wales Railways	Superintendent of the Lines
1920s	New South Wales Government Railways and Tramways	
1932-1973	Department of Railways	Chief Traffic Manager
1973-1980	NSW Public Transport Commission	Operations Manager (Rail)
1980-19xx	State Rail Authority	
19xx-19yy	Rail Access Corporation?	General Manager, Operations Division
19xx-2005	Rail Infrastructure Corporation	General Manager, Access
2005-20xx	RailCorp	
20xx-2012	RailCorp	Service Delivery Group Timetable Development and Program
2012-	Transport for NSW RailCorp	Service Procurement and Performance Service Delivery Group

Things went pretty quiet after this—until the hue and cry which accompanied the SMH’s leaking of the draft WTT in the middle of May 2013. A few weeks later a report entitled *Timetable Assurance– Operational Review* fell off the back of an S-truck. This appeared to be, in some sense, a response to the brouhaha in that it attempted to explain in its 103 pages, the processes through which the WTT came to be. It was apparent that a similar document—the *Customer Service Review*—also exists. These two reports are part of a “suite” of documentation which “demonstrates how the 2013 timetable meets its objectives , which are contained within the *Timetable Production Manual*”. Now *there’s* a document I would like to fall off the back of an S-truck. These documents are set out on our page 5. Of its 23 component documents, only the *Operations Protocol* appears to be in the public domain— and then only if you know where to look. Those in the know seem to think that many of the other documents are “less

than meets the eye”.

The main Chapter headings of this report are reproduced below. They seem to form a coherent rationale for what was done, why it was done, how it was done and what success was achieved. The future might show this to be rather self-serving but let’s take it at face value— though not always in the order that TfNSW presented the document.

Imperatives (Chapter 5)

The driving forces were said to be:

5.1 Transport Administration Act

It has been mentioned before in AATTC publications, but NSW is in the unique position of specifying in binding legislation how the Working Timetable is to be constructed. There is nothing so prescriptive as this in all the world.

It is not, perhaps, quite so surprising here as it would be elsewhere. NSW has form in creating ghastly train timetables and

having to suffer the political consequences. Timetables have for long been a political football in NSW. One can make a case, for instance, the Neville Wran came to power partly on the back of the Lewis Government’s “*Great Timetable Disaster of May ‘75*”. A similar—albeit milder—disaster descended upon the 1996 timetable. A repeat was narrowly averted in 2002 when it was noticed at the last moment that there were too few train staff to implement it.

The Act gives TfNSW—and definitely not its rail agencies—carriage of WTT formulation. The Act also specifies such matters as the size and carrying capacity of trains.

5.2 NSW 2021 Goals 7 and 8

The NSW Government released the [State Plan – NSW 2021](#), at the beginning of September 2011. This ten year plan replaces the 2006 State Plan as the Government’s key strategic business plan. It sets priority areas for action and guides NSW resource allocation in conjunction with the State Budget. The Plan is divided into five key strategic areas— rebuilding the economy; returning quality services; renovating infrastructure; strengthening local environment and community; and restoring accountability. Goal 7 was (apparently) that timetables were to be under constant review. Goal 8 specified punctuality and reliability targets for train service. I had no luck in attempting to access the [NSW 2021](#) web-site. Surely the plan has not been abandoned already?

TfNSW said of it, in its own Corporate Plan (below): “*NSW 2021 is the Government’s 10-year plan to make NSW number one. It guides policy and decision making in conjunction with the budget process, and outlines how government agencies will deliver on priorities for local communities and regions across NSW. NSW 2021 clearly establishes the Government’s focus in delivering an integrated, customer-focused transport system and provides our agency with guidance in delivering on these priorities.*”

5.3 TfNSW Corporate Plan Connections 2012-17

This document, at least, does exist although it is mainly a piece of publicity fluff. This public version does NOT contain what the Operational Review says it contains about Goals 7 and 8— said to be “*Reduce Travel Times*” and “*Making Public Transport a more attractive choice*”. The Operational Review says that Goal 7 will be primarily achieved by decreasing waiting times as a result of increased train frequency. One cannot but notice that this interpretation is a different one from that given to Goal 7 above. It says that attractiveness will come about by ensuring that at least 92% of trains run to time.

3 OBJECTIVES OF THE 2013 OPERATIONAL REVIEW REPORT

- 3.1 Description of the Major 2013 Timetable Operational Changes
- 3.2 Demonstration of Assurance During Development Phase of SWTT

4 TIMETABLE DEVELOPMENT AND VALIDATION PROCESSES

- 4.1 Summary of Timetable Development Process
- 4.2 Timetable Production Manual Input Reference Documents
- 4.3 2013 Timetable Validation and Verification
- 4.4 2013 Timetable Operational Review Focus
- 4.5 Timetable Deliverables and Version Control

5 MEETING TFNSW OBJECTIVES FOR THE STANDARD WORKING TIMETABLE

- 5.1 Transport Administration Act
- 5.2 NSW 2021 Goals 7 and 8
- 5.3 TfNSW Corporate Plan Connections 2012-17
- 5.4 Meeting Independent Transport Safety Regulator Expectations

6 VALIDATION TOOLS AND TECHNIQUES

- 6.1 Timetable Specification and Design Teams Self-checking and Reviews
- 6.2 Timetable Geography Team Self-checking and Reviews
- 6.3 Timetable Production Team Self-checking and Reviews
- 6.4 T-Reps Reports for Timetable Assurance
- 6.5 Timetable Simulation and Evaluation
- 6.6 Signaller, ATRICS and Reliability Assurance Test Plan

7 MEETING CONSIDERATIONS, CONSTRAINTS, PRINCIPLES AND STANDARDS

- 7.1 Meeting Customer Demand
- 7.2 Meeting Timetable Modelling Standards
- 7.3 Meeting Timetable Operational Principles
- 7.4 Meeting Infrastructure Constraints and Principles
- 7.5 Meeting Rolling stock Considerations
- 7.6 Meeting Crewing Considerations
- 7.7 Meeting Railway Related Buses Requirements
- 7.8 Interfaces with Freight and Other Operators, ARTC and CRN

Timetable Production Manual	
Document Title	Comment on applicability to the Operational Review
Introduction to Timetabling - Objectives of the Timetable	Explains the twelve basic principles that apply to timetable development. The document needs to be updated for current Transport Cluster roles and objectives. References to ARTC and ITSr are still valid
Introduction to Timetabling - Rail Operations in Context	A general introduction to the context of Rail Operations. Not referred to for this Operational Review report.
Introduction to Timetabling - Overview of Rail Issues in Sydney	A general introduction to the history of rail issues faced in Sydney up to the late 2000s. Needs to be brought up to date. Not referred to for this Operational Review report.
Introduction to Timetabling - Estimating Rail Passenger Demand	This guide is valid for estimating customer demand levels for services, based on the surveys that are carried out for the Bureau of Transport Statistics. Not referred to for this Operational Review, but relevant for the Customer Service Review.
Introduction to Timetabling - Principles of Timetabling	An explanation of how timetables are developed, working around the constraints of termini, flat junctions, single line working, NSW signalling, crewing and rollingstock, plus the art of transitioning from peak to off-peak services, key failure risks and the main deliverables.
Introduction to Timetabling - Infrastructure Considerations	An explanation of infrastructure constraints for timetables, particularly track, electrical overhead, signals and stations.
Introduction to Timetabling - Rollingstock Considerations	The most comprehensive Timetable Reference Document, and the third most relevant to the Operational Review after Principles of Timetable Modelling and Timetable Operational Principles. Contains most of the Minimum Standards and Desirable Targets mentioned in the review, including the crew timing allowances required to be included in the SWTT for rollingstock operational reasons.
Introduction to Timetabling - Crewing Considerations	General considerations of crewing needs from the Standard Working timetable, but not referred to directly for this Operational Review report. Crew timing allowances are included in the Rollingstock Considerations above.
Introduction to Timetabling - Principles of Timetable Modelling	A short document describing physical impossibilities that are able to be modelled in timetabling software, which need to be removed through validation by qualified timetablers, such as two trains being in the same place at the same time.
Introduction to Timetabling - Provision of Connecting Bus Services	A description of previously provided rail-bus services. While the document is slightly out of date, this Operational Review addresses the current situation for these services.
RailCorp Timetable Requirements – [RailCorp] Timetable Operational Principles	Most of the contents of this document are still valid, although a minor update is required. It addresses the principles of timetable structure, timing, pathing and crossing of trains. This Operational Review explains any recent changes to bring the Operational Principles up to date where appropriate. Two sections are not assessed by the Operational Review, as they form part of the Customer Service Review. These are Passenger Interchange/Connections and Special Services for schools etc.
SWTT Stakeholder needs - Airport Link Company - Summary of ALC Contract requirements for timetables	Checks carried out as part of the Operational Review
SWTT Service Level Agreement	This is the co-signed service level agreement for Standard Working Timetables. It defines the agreed framework and key operational interface arrangements between Timetable Development & Integration and Train Planning relating to the implementation and ongoing maintenance of the SWTT, Rail//Table geographies, Emergency Passenger Working Timetables and all related activities and deliverables.
SWTT Resources – Stabling Yards Capacity - Stabling Pack	The stabling constraints are shown in the Stabling Pack for the current timetable. This is also a timetable deliverable for the 2013 SWTT in its own right.
SWTT Data - Minimum Dwell Times – 2013 Timetable Dwell Times	The Minimum Dwell Times document is produced for each SWTT, based on the underlying geography. It is a comparison to previous timetables/geographies and is a timetable deliverable in its own right as this information cannot otherwise be readily determined by the operator.
SWTT Data Fixed Recovery Times – 2013 Timetable Recovery Times	The Fixed Recovery Times document is produced for each SWTT, based on the underlying geography. It is a comparison to previous timetables/geographies and is a timetable deliverable in its own right, as this information cannot otherwise be readily determined by the operator.
Timetable Development Processes and Timelines - Geography Change Process Flowchart	These high level process flowcharts describe four of the five key roles of the Timetable Development & Integration team (the other being the specifications for major special events and possessions). Minor updates are required, such as changing SWTT Books 4 to 7 to read SWTT Books 4 & 5.
Timetable Development Processes and Timelines - SWTT Development process flowchart	
Timetable Development Processes and Timelines - SWTT Books 1 + 2 - Permanent Timetable Change Process Flowchart	
Timetable Development Processes and Timelines - SWTT Books 4 to 7 - Freight Path Advice and Approvals Process Flowchart	
Operations Protocol	This is the key document that sets out the agreed timeframes for the development of freight timetables.
Feedback Register	These two Sharepoint Site lists are the repository of all timetable feedback and timetable change instructions after the commencement of RailCorp Operational Reviews in mid October 2012. They are both hosted as part of the Timetable Production Manual, but have limited accessibility.
Timetable Change Request Register	

5.4 Meeting Independent Transport Safety Regulator Expectations

To a large extent these expectations flow from the Waterfall smash enquiry. That inquiry's recommendation 9d said that "timetable safety risk and configuration change assessment" ought to be incorporated into the timetable development process—whatever that might mean. What I think it means is that TNSW may not make timetables that require trains to exceed speed limits and rolling stock integrity— i.e. that the wheels don't fall off. After Waterfall, RailCorp said: *RailCorp has nominated a position accountable for timetable safety risk assessment. The new 2005 timetable and any subsequent timetables will be drafted to ensure they are compatible with safety goals.* This responsibility rests with TNSW's General Manger Timetable Development and Integration.

Development and Validation (Chapter 4)

The flow charts at right gives a summary of the processes used to build (upper) and check (middle) the timetable, plus the outputs (deliverables) from these processes. The outputs include the Public Timetable, which is thereby revealed to be laid out in Microsoft's Excel. It always looked that way. More will be said of this.

The Operational Review contains a timeline of sorts of how the timetable development proceeded. It was probably in the minds of the Government before the 2011 election, but the first physical manifestation was the appearance of a **Timetable Change Request** document which was created before the 2010 timetable was introduced. Many of the requests in this were rejected and it was planned to carry them over to the 2011 timetable— but the latter was scrapped, as was the 2012 timetable. The first truly 2013 WTT document came with a **Geography Change Request** in October 2012. This was essentially a call for an update on the track layout— most particularly the arrangement of turn-backs and cross-overs. The version that was leaked to the SMH (*Draft Final Version 2.02*) was released on 24 June 2013. Both the Passenger and Freight WTTs emerged from this process, although at different times— Freight was later. Although Gladys was quick to say the Passenger WTT was NOT final, it really was. Only minor amendments could be accommodated after that date. The timetable had to be at the printers by mid-August 2013. It will be apparent the public consultation played no part in the process.

The evolution of the timetable over this 10-month period was tracked in a **Feedback Register**. After the release of the first draft WTT in April, a new **Timetable Change Request Sharepoint Register** was created. All feedback that was in the nature of suggested modifications went into

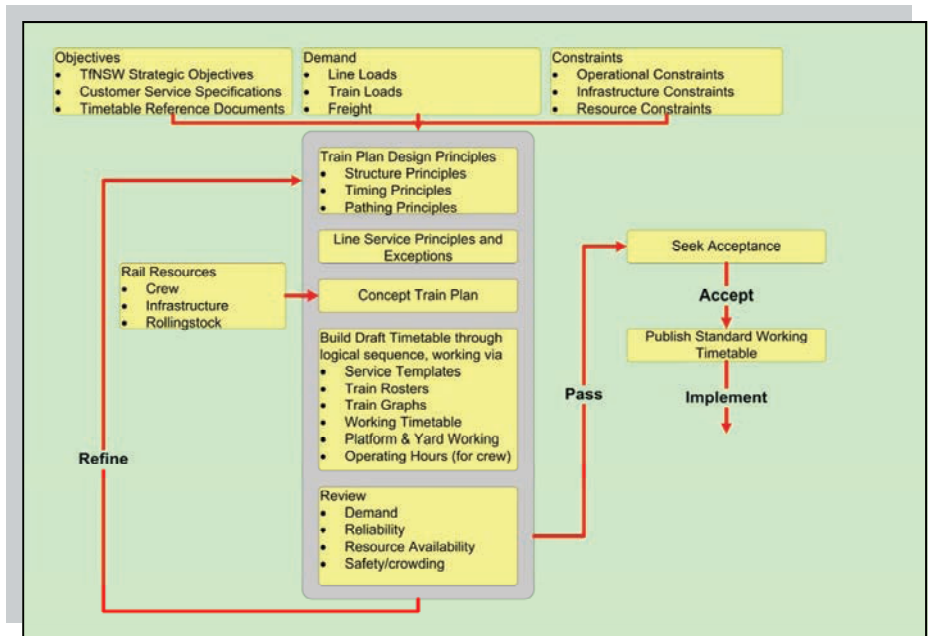
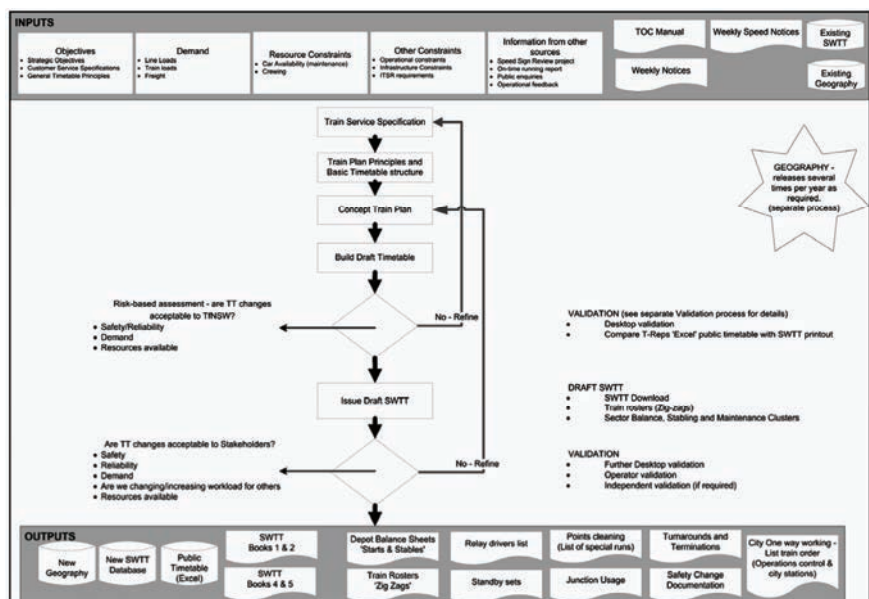
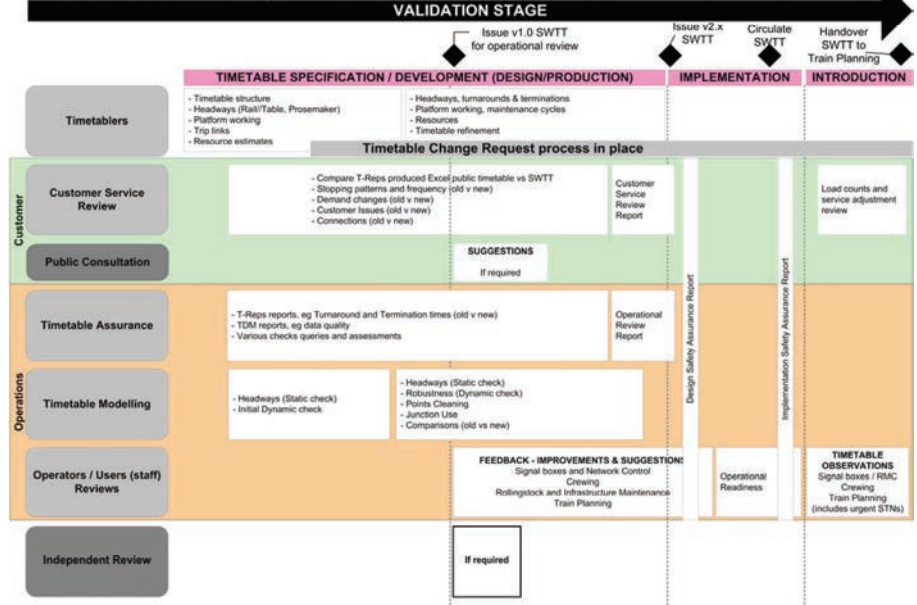


Figure 2 Validation stages in the Timetable Development phase



this. Adoption of such suggestions was under the control of the General Manager.

Clearly, with so much paper flying about, the potential for people to be singing from different music sheets was significant. TfNSW decided that the final version would be distinguished from all of its predecessors by being the only version produced in hole-punched, shrink-wrapped form! The Public Timetable—by which TfNSW presumably means the printed books—was the responsibility of the Customer Experience Division. Somewhere in there the vendors of a number of timetable apps must have been included, but they are nowhere mentioned.

Tools and Techniques (Chapter 6)

Chapter 6 of the Operational Review deals with the technical nitty-gritty of building the timetable. Some changes were needed from previous techniques because TfNSW regarded some of them as inadequate for what it wanted to do. Prime among these was the long-established software called RailTable, which was developed more than a decade ago by Alex Wardrup of TMG International. There was always a tension within Railcorp between the RailTable devotees and the Simu++ devotees (Simu++ is now known as RailSys). RailTable is, in my opinion, best suited to timetable tinkering rather than the creation of *de novo* timetables. TfNSW seems to agree with this and, furthermore, is of the opinion that prolonged tinkering tends to accumulate and amplify “errors” and inconsistencies, rather than ironing them out.

6.1 Timetable Specification and Design Teams Self-checking and Reviews

The boys and girls in these teams were tasked with straightening out the diverse and often conflicting running times in the existing timetable. In addition to problems arising from initial inconsistencies from years ago, from changes in signalling and rolling stock performance, there was also the problem of “jitter” that had crept into the timetable over a period of time. I had it put to me some years ago that these were personnel-related. It was said that when one person took over from another at lunchtime, a different set of running times for the same section might appear in the timetable. RailTable works to a precision of 6 seconds (0.1 minute), but the numbers are always rounded up or down to the nearest minute. Different people had different ideas about rounding.

So the team analysed years of data to winkle out both the inconsistencies and the inappropriate (too short, too long) running times. This included analyses of recovery times. The principal aim was to find places where both running times and recovery times could be reduced, so that train fre-

quency could be increased.

6.2 Timetable Geography Team Self-checking and Reviews

The Geography Team were charged with keeping the “geography” (track geography) up to date—making sure that, as it was altered or improved, those changes made their way into train planning. The principal foci were things like the Revesby quadruplication and the Lidcombe and Homebush turn-backs.

6.3 Timetable Production Team Self-checking and Reviews

Once the design team had produced its first draft timetable, it was the job of the Production Team to ascertain whether certain goals had been fulfilled. This included risk management targets, potential timetable clashes and headway inconsistencies, to confer with signallers over potential workload problems, to make sure the rule-book had been followed, that the explanatory notes in the timetable were consistent and clear, and to ensure that the final print production version layout was consistent and clear.

6.4 T-Reps Reports for Timetable Assurance

¿TREPS? ¿Que?

For the uninitiated (i.e. all of us), T-reps is an old Access database inherited from RailCorp which is used to feed into an Excel spreadsheet which in turn is used to produce the Public Timetable booklets. That is its normal function, but TfNSW has adapted it as an analytical tool to cross-check the outputs of the timetable production process. It is easier, it seems, to use Excel than it is to use the timetable programs themselves. The sorts of things that were cross-checked with T-Reps were:

- * Are there timing points missing from the WTT?
- * Are empty train movements timetabled to “stop for passengers”?
- * Are trip descriptions coherent? For instance does a “trip” say it has a predecessor trip, but there is no such predecessor trip to be found?
- * Are station stops shown as lasting zero seconds?
- * Are turn-around correctly described?
- * Are freight train running times consistent?
- * Are the toilets being locked and unlocked at appropriate places?
- * Are the train-duty cycles (Zig-Zag diagrams) consistent with maintenance requirements?

6.5 Timetable Simulation and Evaluation

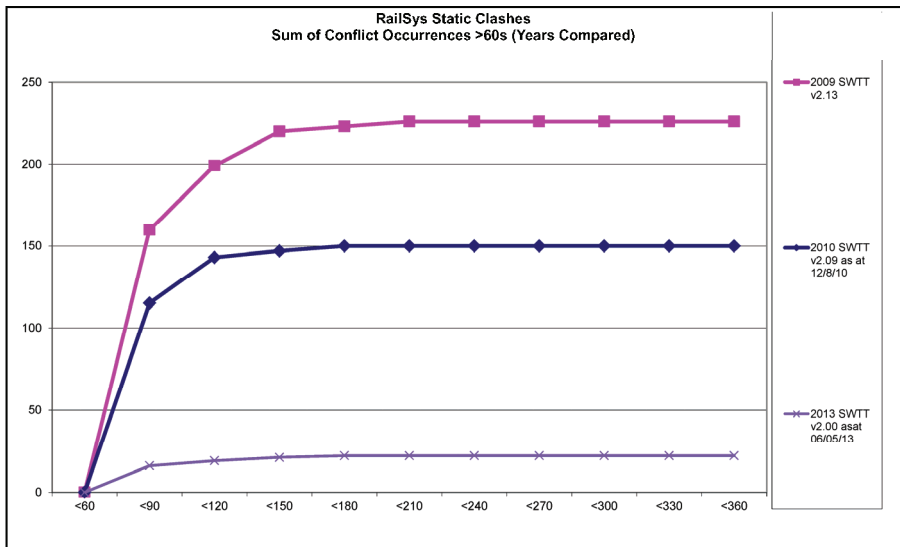
This is a very interesting section of the Operational Review and its main aim is to

demonstrate whether the planned timetable is “better” in some way that those that have gone before it.

The first task was to evaluate past timetables for their sensitivity to disruption and then to compare those with the sensitivity of the new timetable. For this, TfNSW used a number of tools but mostly RailSys—a simulation program formerly known as Simu++. Such programs take a specified timetable and perturb it with random changes (such as those due to prolonged standing time, signal stops, etc.) and to analyze the flow-on effects which they produce. RailSys produces a Static Clash Report, which analyses timetables for weaknesses caused on multiple lines by trains crossing one another’s path without an adequate time separation buffer. The diagram overleaf shows the cumulative number of such static clashes for the 2009, 2010 and 2013 timetable for clash buffers of 60s to 360s—1 to 6 minutes at 30 second intervals. A graph that climbs more slowly and levels out at a lower level represents a timetable that has fewer possibilities for delays due to clashes. It does not take an eye of faith to convince oneself that the 2013 timetable ought to be a better one than the two which have gone before it. The long and short of this is that potential delays of 1 minute or more have been cut from about 240 per day to 20 per day—a very significant reduction. Similar charts were produced just for the various refinements of the draft 2013 timetable, showing how the development process was producing successively better timetables between Version 0.05 and Version 2.00. TfNSW used a program called “Prosemaker” to carry out this latter analysis. I have no idea what this is—Googling on the name produces only baffling results

TfNSW also used RailSys to carry out dynamic analyses on the proposed timetable. Essentially, such analyses use repeated simulations to measure the ability of a timetable to recover from mishaps of various sorts. What they produce, in the end, are assessments of the punctuality of the new timetable relative to the old timetable. Somewhat disappointingly the new timetable is no better than the old—neither in morning peak, middle of the day nor afternoon peak. There seems to be some sort of glass ceiling, above which “real” timetables are unlikely to rise.

Another analysis carried out was that of the junction usage in the new timetable. There are 3883 more crossings and 380 fewer switches in the new timetable. I leave it as an exercise for the reader to explain these to me. Associated with this was a “Points Cleaning Report”. It is required that the rail at all points be kept shiny and electrically conductive by running at least one train over them in a 72-hour period.



Meeting Targets (Chapter 7)

This is by far the biggest section of the Operational Review and gives descriptions of whether (and how) 269 targets have been met. A very large number of the criteria relate to rolling stock constraints. There are two criteria here— have *minimum* standards been met? (145 “ticks”) and; have *desirable* targets been reached? (120 “ticks”); leaving only 4 criteria where the new timetable process has failed completely.

7.1 Meeting Customer Demand

This is a very short component of the Operational Review and is reproduced in its entirety below.

The Customer Service Review addresses the customer demand questions outlined in TTRef #4 “Introduction to Timetabling – Estimating Rail Passenger Demand”, as well as the guidance on First and Last Trains in TTRef #5 “Introduction to Timetabling – Principles of Timetabling”. The Customer Service Review covers how the service levels and journey times are achieved by individual lines (benefits and impacts), and provides full details of service changes in response to the Customer Service Specifications. The Customer Service Review identifies possible passenger demand issues that are recommended to be observed following timetable introduction.

Clearly the “Customers”—who used to be called “Passengers”—are the purchasers of the product. If they don’t buy, the timetable has failed. Thus the Customer Service Review is really a “What we achieved” document that is of great relevance to the Operational Review— which is the “How we brought the good news” document.

7.2 Meeting Timetable Modelling Standards

“Trains cannot appear and disappear at will”

Fancy that! This one of a handful of princi-

ples addressed in Section 7.2— and most are of this ilk. They seem like they would be found in the opening pages of the “Kindergarten Primer of Timetabling”. It’s making a virtue out of a necessity— but it IS a necessity because the timetabling programs do not physically prevent a human operator from making mistakes. They should be picked up during validation.

7.3 Meeting Timetable Operational Principles

In this section, TfNSW address 4 broad principles: Structure, Timing, Pathing and Crossing Trains, with a total of 48 targets to meet. All were met or exceeded.

Some of the more significant targets in this list were:

- * Standard frequency of service
- * Minimum of different stopping patterns
- * Sectorisation of services (“Steel Clearways”)
- * Adherence to “clock face” times at stations
- * Full trains to run Express (this is very controversial)
- * Trains to leave ahead of time from Strathfield and similar “Setting Down” stations
- * Trains to be 8-cars wherever possible.
- * Departing trains at Sydney Terminal to be given preference over Arriving trains.
- * Train path headways to be consistent with signalling and safety.
- * In “RailCorp territory”, paths to be provided for freight trains
- * Headways to be no less than 3 minutes wherever possible
- * Minimal use of flat crossings
- * Turnbacks only at designated turnback locations.
- * Trains running in the “Peak Direction” to have preference.

Minimising stopping patterns is one of the more important principles to be adhered to in the list above. It was one of the major downfalls of the disastrous 1975 timetable.

“Jitter” in this parameter leads to trouble by two means— confusion in the minds of operators and a reduction of capacity akin to that produced by jitter in running times.

Most of the principles of Crossing Trains seem to be cosmetic in that they define how the crosses are to be displayed in the SWTT

7.4 Meeting Infrastructure Constraints and Principles

Two targets are to be met here:

- * Allowing track access for maintenance
- * Good estimates of power requirements

While both targets have reached the minimum required, there seems to be some nervousness about the second. Power requirements stem from an original estimate made by Ove Arup in 2006 for a theoretical “2016 timetable”. The Operational Review notes, in particular, that the projections of the effects of air conditioning are rather wobbly and that the criteria have been changed more than once during the timetable construction process. These matters were regarded as “critical” and were “subject to Executive Review”—but it is unclear whether this happened.

7.5 Meeting Rolling stock Considerations

The Operational Review estimates that 87% (or 1060) of the available 1224 cars will be required to run the service. A table of how the different trains sets are to be used in traffic appears on our page 9.

Section 7.5 of the Review spends an excruciating amount of effort in analyzing how such a target has been met. There are 34 sets of criteria, spread over 40 pages of the report, devoted as follows:

- 4 to availability of rolling stock;
- 2 to allocation of rolling stock;
- 1 to run numbering
- 9 to stabling and associated matters (including unlocking toilets)
- 4 to standby trains
- 11 to miscellaneous other things,

with some 200 criteria to be met. It is a bewildering panoply of targets and one has to wonder whether achieving them is the job of timetablers at all. Perhaps two categories that are definitely timetablers’ jobs are 7.5.18—Turnaround Timetable Allowance and 7.5.19—Termination Timetable allowance, although both seem to have little relevance to rolling stock issues. They have been the bugbear of many a timetable.

A Turnaround Time Report and the underlying data have been provided for the 2013 Timetable—for information and to help with Operational Readiness. In Figure 7 overleaf, the Black bars represent turnaround times for revenue services in the current timetable, and the Red bars represent turnaround times for revenue services

@ Oct 2013 Sector distribution of suburban sets (8-car trains) with 52 Waratahs in Service (56 delivered)

	Sector 1	Sector 2	Standbys / spares/ hold	Projects	Minor services	Sector 3	South Coast	North Intercity	West Intercity
Waratah	52	32				20			
Millennium	16	15		1					
Tangara	51	28	1	3		18	1		
C-set	6	6							
K-set	18	4		1		13			
S-set	24	6	2		5	11			
V-set	20 1/2							10	10 1/2
Oscar	25			2 1/2			10	12 1/2	
212 1/2	28	63	3	7 1/2	5	62	11	22 1/2	10 1/2
89% % A/C	100%	90%			0%	82%			

And by the end of Waratah deliveries:

2014 Sector distribution of suburban sets (8-car trains) with 72 Waratahs in Service - VERSION 72.5

	Sector 1	Sector 2	Standbys / spares/ hold	Projects	Minor services	Sector 3	South Coast	North Intercity	West Intercity
Waratah	72	32				40			
Millennium	16	15		1					
Tangara	51	28	1	3		18	1		
C-set	6	6							
K-set	18	10			4	4			
S-set	4		2	1	1				
V-set	20 1/2							10	10 1/2
Oscar	25			2 1/2			10	12 1/2	
212 1/2	28	63	3	7 1/2	5	62	11	22 1/2	10 1/2
% A/C	100%	100%			80%	100%			

in the 2013 timetable. The lighter colour bars represent turnaround times for trains that either came from or proceed to empty service. Driver step-back operations will still be required at Bondi Junction, but are

no longer required at Epping. Three locations will require operational attention, namely Waterfall, Richmond and Hornsby, as they have turnaround times less than in the current timetable. A number of loca-

tions have improved turnaround times.

A Terminations Time Report and the underlying data have been provided for the 2013 Timetable. There has been a reduction in the number of termination times for 8-car trains that are less than the three minute target compared to the current timetable, reducing from over 50 instances to around 20. All but one of these 20 are a legacy of the weekend structure and should be able to be removed in a future timetable. A second 2 minute termination time at Bondi Junction was recently added via TCR 184, after the original report was released.

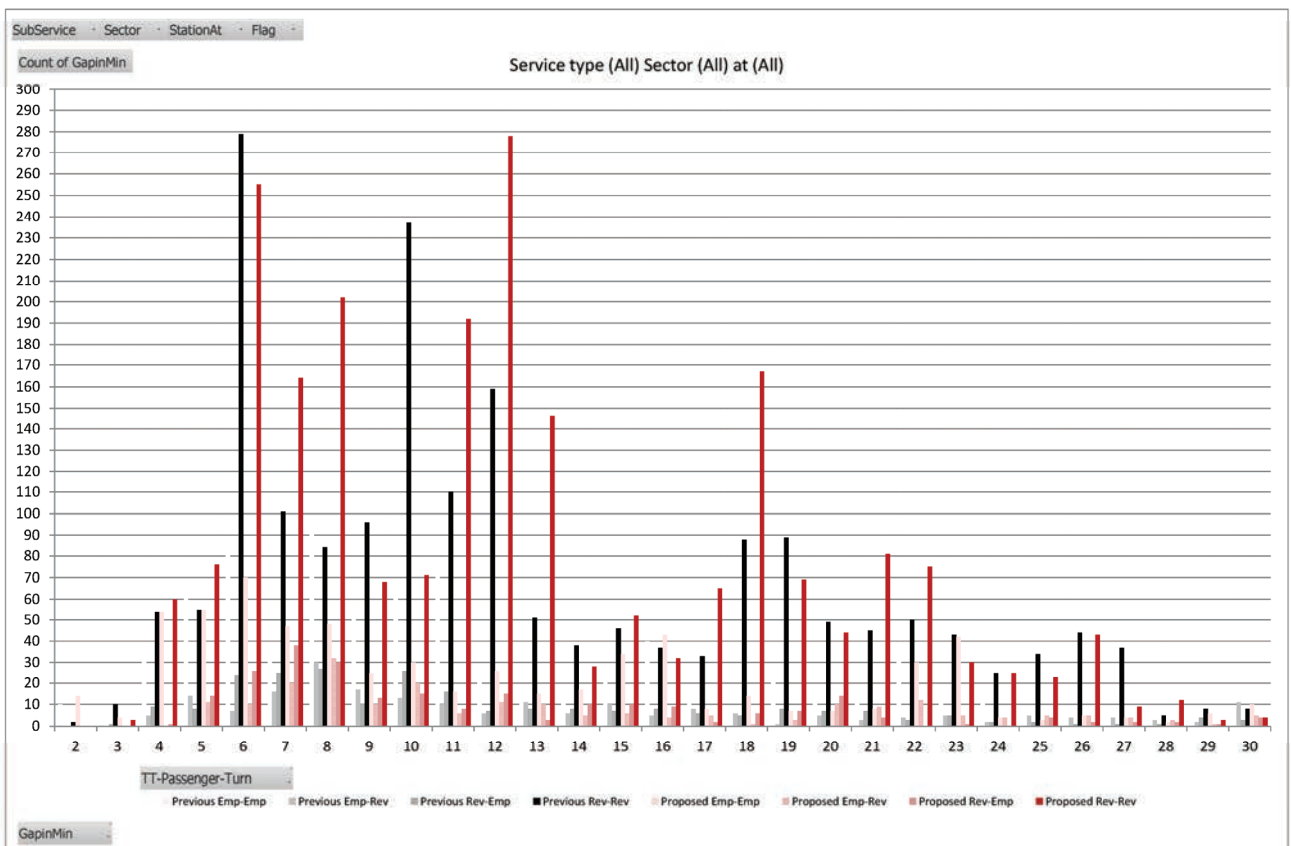
7.6 Meeting Crewing Considerations

Where do drivers come from? *That* is the question. That is the question that CityRail appeared to forget to ask in advance of the May 2002 timetable. The SWTT had already been printed twice before someone realised that the service it described needed far more drivers and guards than CityRail had in its employ.

In 2013, the timetablers didn't compute the number of crew needed to run the service but they did hand over to "OpCrew", a table of weekly revenue kilometrage and operating hours on a sector-by-sector basis, comparing the 2010 and 2013 timetable (below).

There is an increase in revenue kilometrage of 5.1% achieved with an increase of only 2.6% of driver time. Taking exces-

Figure 7 Summary of Changes to Turnaround Times



sive liberties, one can calculate the average speed of the trains from this:

- 42.1 kph in 2010 to:
- 43.1 kph in 2013

This doesn't seem like much and the 1 kph improvement is pretty similar across all sectors. As a rough guide, it would save less than a minute on a 100 km trip from Blackheath.

**What do we want?- Deliverables!
When do we want them?- NOW!**

What the process delivered is (at the foot of Fig3):

- * New Geography
- * New SWTT database
- * Public timetable (Excel)
- * SWTT Books 1&2
- * SWTT Books 4&5
- * Depot Balance Sheets (“Starts and Stables”)
- * Train Rosters (“Zig-Zags”)
- * Relay drivers list
- * Standby sets
- * Points Cleaning Runs
- * Junction Usage
- * Turnarounds and Terminations
- * Safety Change Documentation
- * City One-way Working List.

Impressive as this may appear, it is no

more than that which emerges from any new timetable. But never mind the width—feel the quality!— this is all new improved stuff.

Although the Operational Review was a self-assessment exercise, one would be inclined to say that it should lead to a “good” timetable— at least from an operator’s perspective. TfNSW considers that this timetable will satisfy the stakeholders.

But there are half a million elephants in the room— the customers who are going to be asked to buy it. Like all elephants they have long memories— memories of three previous timetable disasters.

Rail customers seem to be a curmudgeonly lot who, at best, take a glass half-full approach. We can see it already on the responses to both the leaking of the SWTT and the leaking of the Operational Review. These reactions came mainly from the few scraps of information that could be pieced together from the Executive Summary of the Operational Review and from the painstaking sifting through the 800-page SWTT itself.

Like Donald Rumsfeld, “we don’t know what we don’t know”. Specifically, we don’t know what is in the Customer Service Review— the companion volume to the Operational Review. Can it explain

itself in a plausible manner and dampen down the rising tide of disgruntlement. People lose their grundle fairly easily— it will take a lot of talking to sooth them.

What they get is summarised, to some extent, in the Executive Summary and in the Attachment to the Operational Review. The opening paragraphs of it say:

The primary motivation for re-writing the Standard Working Timetable (SWTT) comes from a need to put the customer at the centre of everything we do, while retaining or even enhancing railway passenger service reliability, accommodating both changing demand for rail travel and safe operations, through the efficient use of currently available or newly acquired resources (crew, rolling stock, infrastructure). For the 2013 SWTT, an increase in peak hour journeys will be achieved by implementing a number of rail capacity strategies and rail service strategies to both increase and optimise the utilisation of rail capacity, whilst maintaining reliability and robustness, and continually improving the quality of the Standard Working Timetable.

You be the judge.

Weekly Revenue Kilometres	Total Revenue Distance (km)		
ReportingLine	2012	2013	Difference
Sector_1_Suburban	61,258	62,549	1,292
Sector_1_Intercity	50,762	50,604	-158
Sector_2_Suburban	149,726	155,623	5,897
Sector_2_Intercity	19,774	24,341	4,567
Sector_3_Suburban	143,302	156,864	13,562
Sector_3_Intercity-Blue Mountains	47,096	46,302	-794
Sector_3_Intercity-Newcastle and Central Coast	79,809	83,698	3,889
Grand Total	551,726	579,981	28,254

Weekly Revenue Operating Hours	Total Journey Time (h)		
ReportingLine	2012	2013	Difference
Sector_1_Suburban	1642	1643	1
Sector_1_Intercity	1047	993	-53
Sector_2_Suburban	4218	4307	89
Sector_2_Intercity	282	348	66
Sector_3_Suburban	3630	3879	249
Sector_3_Intercity-Blue Mountains	865	817	-47
Sector_3_Intercity-Newcastle and Central Coast	1391	1429	37
Grand Total	13077	13420	342



Paris Archives

By CONRAD SMITH

THE FRENCH NATIONAL Copyright Library, the Bibliothèque Nationale (BN) in Paris, conserves many timetables, some more available than others for consultation. Unlike the National Library in London, one is quite free to photograph whichever pages in a book one asks to inspect, although a permit is required for the most fragile items.

Foremost in the collection are the many examples of the Indicateur Chaix, named after Napoléon Chaix, the most prolific publisher of train times from the earliest days, who admitted to taking his cue from George Bradshaw in the UK.

There were competitors in the early days, such as the 'Mayence' and numerous regional publications and 'ABC' types, but all were eventually subsumed into the Chaix empire. Individual railway companies gradually came to abandon their own attempts at publishing train times and appointed Chaix officially as their publisher; Chaix duly produced dedicated selections from the universal edition, allowing the same typeset pages to be used in different publications.

Thus a 'Chaix' is even more generic a description of any railway timetable in France than is a 'Bradshaw' in the UK. The Imprimerie Chaix [Chaix printing house] was recognised in 1938 as the official publisher for all its timetables by the nascent SNCF, the nationalised French railway system. This happy state of affairs lasted until 1975 when the Chaix company, still publishing timetables for the SNCF, became embroiled in a prolonged labour dispute; following a series of mergers and takeovers with other publishing houses, it was proposed to reduce the workforce from 640 to 230. After three months of occupation of the printing works, and some

68 acrimonious months during which the timetables failed to appear, the company was re-launched by a new owner in 1981, having acquired the premises by auction, with only 47 employees.

Meanwhile, the SNCF was obliged to publish its own train times which it did somewhat reluctantly in suburban, regional and combined forms. Its offerings were rarely conspicuous at bookstalls, and had to be requested specifically at booking offices for purchase. Production ceased completely in 2007. There is no SNCF timetable now, not even a pdf version such as that for National Rail in Great Britain. For a while, access to a comprehensive printed version of French rail times in France was confined to the Thomas Cook timetable printed in England and sold in France, but even this has now ceased publication.

Joining the BN as a reader is by interview leading to the purchase of a subscription, which then equates to €3+ per visit, but a growing proportion of the collection is being digitised, although for copyright reasons some digitised images can be viewed only within the BN itself, where there is an abundance of computer termi-

nals.

Much out-of-copyright material is available generally on the Internet, however, and some of the more interesting examples for our purposes are summarised in the table below.

Foremost are the 60 copies of the Chaix timetable from 1871 to 1880 for the PLM railway, which can be downloaded freely from the BnF site, subject to the usual provisos for commercial use and publication.

The Chaix timetable was advertised then to appear 'every eight days' which in fact meant weekly, from Sunday to Sunday. The quality of the paper used sometimes did not reflect this expected lifetime in regular use, and early original paper copies at the BN are still crisp and legible after the best part of two centuries, although by the 1880s use was made of acid-based paper more like newsprint which has not fared so well. Some later editions are available only to a restricted academic few, or are withdrawn completely from consultation pending remedial conservation work.



web address	location	lines	year[s]	issues	pages per issue [example]
http://gallica.bnf.fr/ark:/12148/cb327907537/date	Paris	local	1858-1859	27	16
http://gallica.bnf.fr/ark:/12148/cb327851438/date	Paris	Mediterranean	1871-1880	60	16
http://gallica.bnf.fr/ark:/12148/bpt6k5814119w	Switzerland	national	1898	1	374
http://gallica.bnf.fr/ark:/12148/cb344937782/date	Paris	local fares	1894-1914	14	442
http://gallica.bnf.fr/ark:/12148/bpt6k5813490x	Paris	national	1915	1	106
http://gallica.bnf.fr/ark:/12148/bpt6k5816081h	Paris	south west	1912	1	163
http://gallica.bnf.fr/ark:/12148/cb32772305b/date	Paris	some times	1855	6	8
http://gallica.bnf.fr/ark:/12148/bpt6k841941	Paris	Rouen steam-boats	c. 1830	1	269

Serving West Hobart and North Hobart

By HILAIRE FRASER

CONTINUING FROM ARTICLES previously published in "The Times" firstly on the Hobart-Glenorchy corridor, serving Hobart's middle northern suburbs, secondly bus services on Hobart's eastern shore and thirdly bus services in Hobart's southern suburbs, this article will describe current bus services in Hobart's inner western and northern suburbs.

Historically Hobart's inner western and northern suburbs were served by trams to West Hobart, Lenah Valley, North Hobart, Springfield and along Main Road to Glenorchy. The West Hobart and North Hobart routes were replaced by trolley buses. The North Hobart service was incorporated in the New Town Station and Cornelian Bay trolley bus service, although for a while trams and trolleybuses served North Hobart at the same time.

West Hobart and Mt Stuart are serviced by the following routes:-

3 Hobart-West Hobart via Forest Rd (one outward trip leaving Hobart at 7.55am school days only)

4 Hobart-Mt Stuart via West Hobart (operates hourly Monday to Fridays daytime and every fifteen minutes in peak periods)

5 Hobart-Mt Stuart via Forest Rd & West Hobart (operates hourly Mondays to Friday and every thirty minutes in pm peak)

Routes 4 & 5 combine to operate a thirty minute service over most of their respective routes which are common.

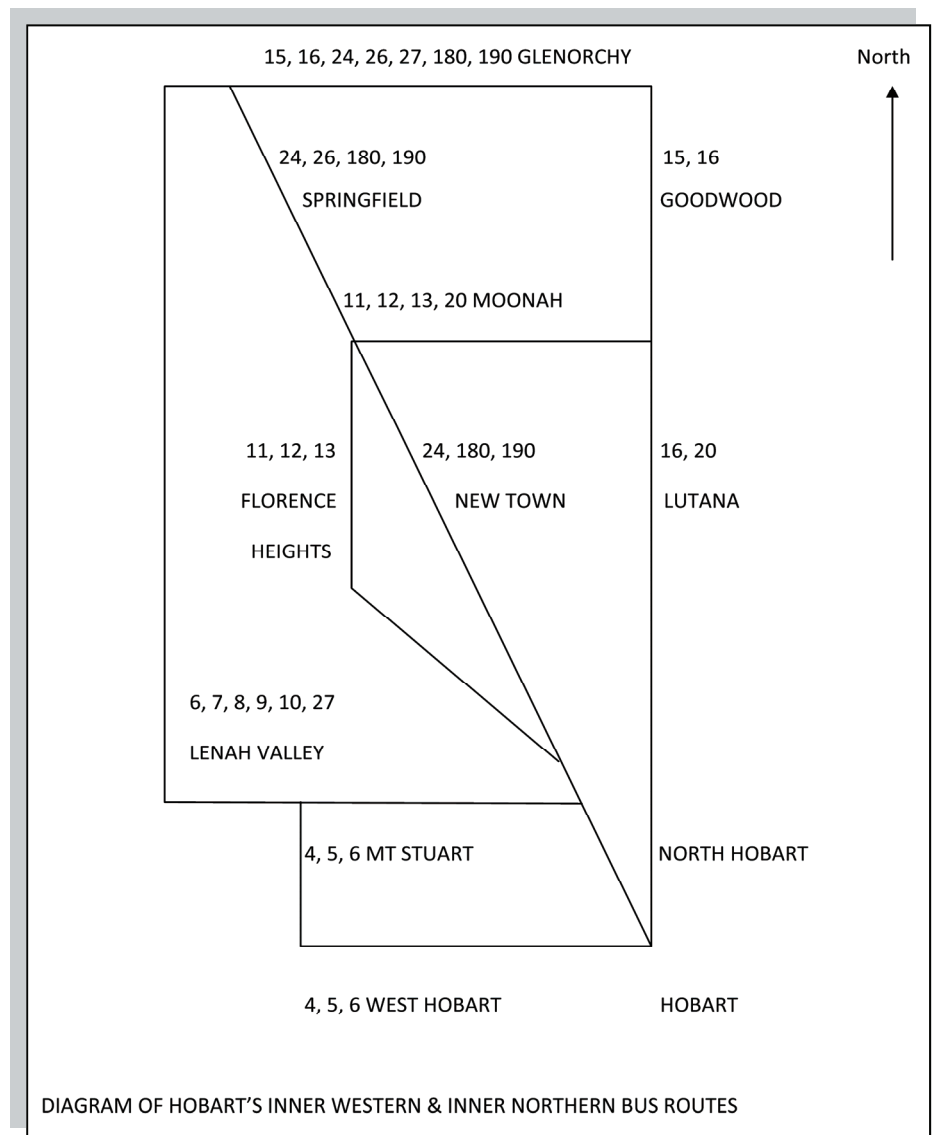
6 Hobart-Lenah Valley via West Hobart & Mt Stuart combined service (operates every thirty minutes on Saturdays, hourly evenings and Sundays until 7.15pm)

As well as route 6 Lenah Valley is serviced by the following routes:-

7 Hobart-Lenah Valley (two inward trips leaving Lenah Valley at 8.30am and 8.50am Mondays to Fridays)

8 Hobart-Lenah Valley via Girrabong Rd (operates hourly inwards Mondays to Fridays am, outwards pm and thirty minutes inwards am peak and outwards pm peak). This service transports passengers into Hobart in the am and out of Hobart in the pm.

9 Hobart-Lenah Valley via Giblin St & Ruth Dr (operates every 120 mins Monday to Friday off peak and half-hourly in peak



periods)

10 Hobart-Lenah Valley via Pottery Rd & Ruth Dr (operates every 120 minutes Monday to Friday off peak and one trip inward am peak and one trip outward pm peak)

Routes 9 & 10 combine to operate an hourly service along Ruth Drive.

27 Hobart-Glenorchy via Lenah Valley (operates hourly outwards Mondays to Fridays pm, inwards pm). This service transports passengers to Glenorchy in the am and back in the pm.

X6 Hobart-Glenorchy via Lenah Valley (designated stops only, operates every thirty minutes inwards am peak, outwards pm peak)

Routes 8 or 27, 9 and 10 combine to operate a 30 minute service along August Rd to

Lenah Valley.

Florence Heights is served by the following routes:-

11 Hobart-Moonah via Florence Heights

12 Hobart-Moonah via Jutland Village & Florence Heights

13 Hobart-Moonah via St Johns Park & Florence Heights

14 Hobart-Glenorchy via Florence Heights

As can be seen from Florence Heights timetable provided with this article route 11, 12 and 13 combine to provide an hourly service Mondays to Fridays. Route 14 operates as an extension of route 11 in peak periods and the 3.40pm route 20 trip from Hobart to Moonah via

Lutana extends from Moonah to Florence Heights.

Lutana and Goodwood are serviced by the following routes:-

15 Hobart-Glenorchy via Goodwood (operates hourly Monday to Fridays off peak and every thirty minutes in outwards in pm peak periods and two-hourly on Saturdays)

16 Hobart-Glenorchy via Lutana & Goodwood (operates some early trips Mondays to Fridays and two-hourly on Saturdays and every 90 minutes Friday evenings, also approximately two-hourly on Sundays)

15 and 16 combine to provide an hourly service over their common route on Saturdays.

20 Hobart-Moonah via Lutana (operates every hour Mondays to Fridays off peak and every thirty minutes inwards am peak and outwards pm)

Route 21 Moonah-East Moonah-Moonah-

West Moonah operates Monday to Fridays with services departing Moonah at 8.58, 9.58, 10.58, 12.58, 2.08.

Springfield is serviced by the following routes:-

22 Glenorchy-Springfield (operates every 50 minutes Monday to Fridays off-peak)

24 Hobart-Glenorchy via Springfield (operates 30 minutes inwards am peak and outwards pm peak).

26 Springfield Depot (designated as Metro Springfield in timetables)-Glenorchy via Springfield (operates 40 minutes outwards am peak, inwards pm peak). Two trips departing Glenorchy Mondays to Thursday evenings at 8.01pm and 9.38pm for Springfield Depot provide the only evening service on these nights.

29 Springfield Depot-Tolosa St via Springfield & Glenorchy (operates hourly Friday evenings and Saturdays)

180 Hobart-Glenorchy via West New

Town and Springfield

190 Hobart-Glenorchy via East New Town and Springfield

180 and 190 both operate every 100 minutes Mondays to Fridays and on average provide a 50 minute service to Springfield. 180 and 190 combine the New Town Shoppers's Services with the City-Springfield Service.

Inner western and northern services are covered by the following four passport size timetable leaflets produced by Transit-Graphics:-

3, 4, 5, 6, 7, 8, 9, 10, 27, X6 Lenah Valley, Mt Stuart & West Hobart to Hobart City

11, 12, 13, 14 Moonah & Florence Heights to Hobart City

15, 16, 20 Goodwood & Lutana to Hobart City

21, 22, 24, 26, 29, 180, 190 Springfield, Moonah & New Town to Hobart City.





Look for bus numbers

11
12
13
14

Moonah & Florence Heights to Hobart City

Buses operate linking:



See back for detailed route descriptions

Effective 20 November 2011



Bus Route Descriptions

- 11** Moonah to Hobart City via Florence Heights, New Town & North Hobart. Service operates Monday–Friday.
- 12** Moonah to Hobart City via Florence Heights, New Town, Jutland Village & North Hobart. Service operates Monday–Friday.
- 13** Moonah to Hobart City via Florence Heights, St Johns Park, New Town & North Hobart. Service operates Monday–Friday.
- 14** Glenorchy to Hobart City via Moonah, Florence Heights, New Town & North Hobart. Service operates Monday–Friday.

Timetable also shows Route 20 service that travels to Florence Heights. For complete details of this service, please see separate timetable available from your distribution outlet.



For timetables, maps, fares and tickets call the Information Hotline

13 22 01

or visit



PO Box 61, Moonah TAS 7009

TG10500 | Version 2 | 20 November 2011

Welcome Aboard Metro

This timetable details the bus services operated by **Metro** in the areas listed on the cover.

Our bus services will enable you to go shopping, to work, to school or to social events, quickly and comfortably.

At the bus stop please ensure you “hail” the bus driver of the bus you wish to catch and where possible tender the correct fare.

Please move to the back of the bus and make the seats in the front rows of the bus available for elderly or less able passengers.

Copies of timetables and other information about services we operate are available by calling **13 22 01** or by visiting www.metrotas.com.au.

How to use this timetable

1. Using the route map provided, find the two timing points you are located between.
2. Locate these two timing points on the timetables.
3. Your bus is scheduled to arrive between the times shown for these points. For example, if your bus stop is situated between timing points **A** and **B** on the map, then the bus is scheduled to arrive between the time listed for **A** and the time listed for **B**.

Please note all times are approximate only and may vary due to traffic conditions. It is advisable to be at your bus stop at least five minutes ahead of the indicated time.

Metro Tickets

A range of tickets are available for travel on **Metro** services. Tickets work on a sectional basis: the further you travel, the more you pay. Section numbers are indicated on all bus stops.

Our most popular ticket options include:

- **Single use** tickets, which are purchased from the bus driver; or
- **Metro Greencard**, a smartcard that can be recharged with credit. Customers may be eligible to receive 25% bonus travel credits (conditions apply).

For more information on all **Metro** tickets please call **13 22 01** or visit www.metrotas.com.au



Glenorchy & Moonah - Florence Heights - New Town - North Hobart - Hobart City

Glenorchy Stop D Metro Springfield Stop A Moonah / Albert Rd Gerrard St / Creek Rd Wellwood St / Giblin St Elizabeth St / Strahan St **Hobart City** Elizabeth St



map ref
Look for bus numbers

Monday to Friday

	14	7.33	7.38	C 7.41	7.46	7.48	8.00	8.09
	14	8.00	8.06	C 8.09	8.17	8.20	8.31	8.40
am	11	....	....	L 9.22	9.30	R 9.33	9.40	9.47
	12	....	....	L 10.22	10.27	10.30	10.40	10.47
	11	....	....	L 11.22	11.30	11.33	11.40	11.47
	12	....	....	L 12.22	12.27	12.30	12.40	12.47
pm	13	....	....	L 1.22	1.28	1.36	1.45	1.52
	11	....	....	L 2.22	2.30	2.33	2.40	2.47
	13	....	....	3.39	3.49	3.57	4.07	4.16
	20	....	....	4.10	4.17	....	....	....



Hobart City - North Hobart - New Town - Florence Heights - Moonah & Glenorchy

Hobart City Elizabeth St Strahan St Wellwood St / Giblin St Gerrard St / Creek Rd Moonah / Albert Rd Metro Springfield Stop A Glenorchy



map ref
Look for bus numbers

Monday to Friday

	11	9.50	9.57	10.05	10.07	L 10.15	....	....
	11	10.50	10.57	11.05	11.07	L 11.15	....	....
am	13	11.45	11.52	12.01	12.03	L 12.15	....	....
	12	12.50	12.57	1.05	1.07	L 1.15	....	....
	13	1.45	1.52	2.01	2.03	L 2.15	....	....
pm	12	2.50	R 2.56	3.05	3.07	L 3.15	....	....
	20	H 3.40	....	....	....	Z 4.10	....	....
	14	4.35	4.42	4.51	4.54	M 5.01	5.04	5.12
	14	5.35	5.42	5.51	5.54	M 6.01	6.04	6.12

Explanations

- C** Time shown is for Charles St - bus does not travel via Albert Rd.
- H** Bus departs from Stop H and travels via Cressy St, New Town.
- L** Connection available here to or from Route 20 (Moonah to Hobart City via Lutana & New Town) - please refer to the separate Goodwood & Lutana timetable available from your distribution outlet.
- M** Time shown is for Main Rd - bus does not travel via Albert Rd.
- R** Bus travels via Rattle St.
- Z** Bus continues beyond this point. Please see the other timetable on this page for details.

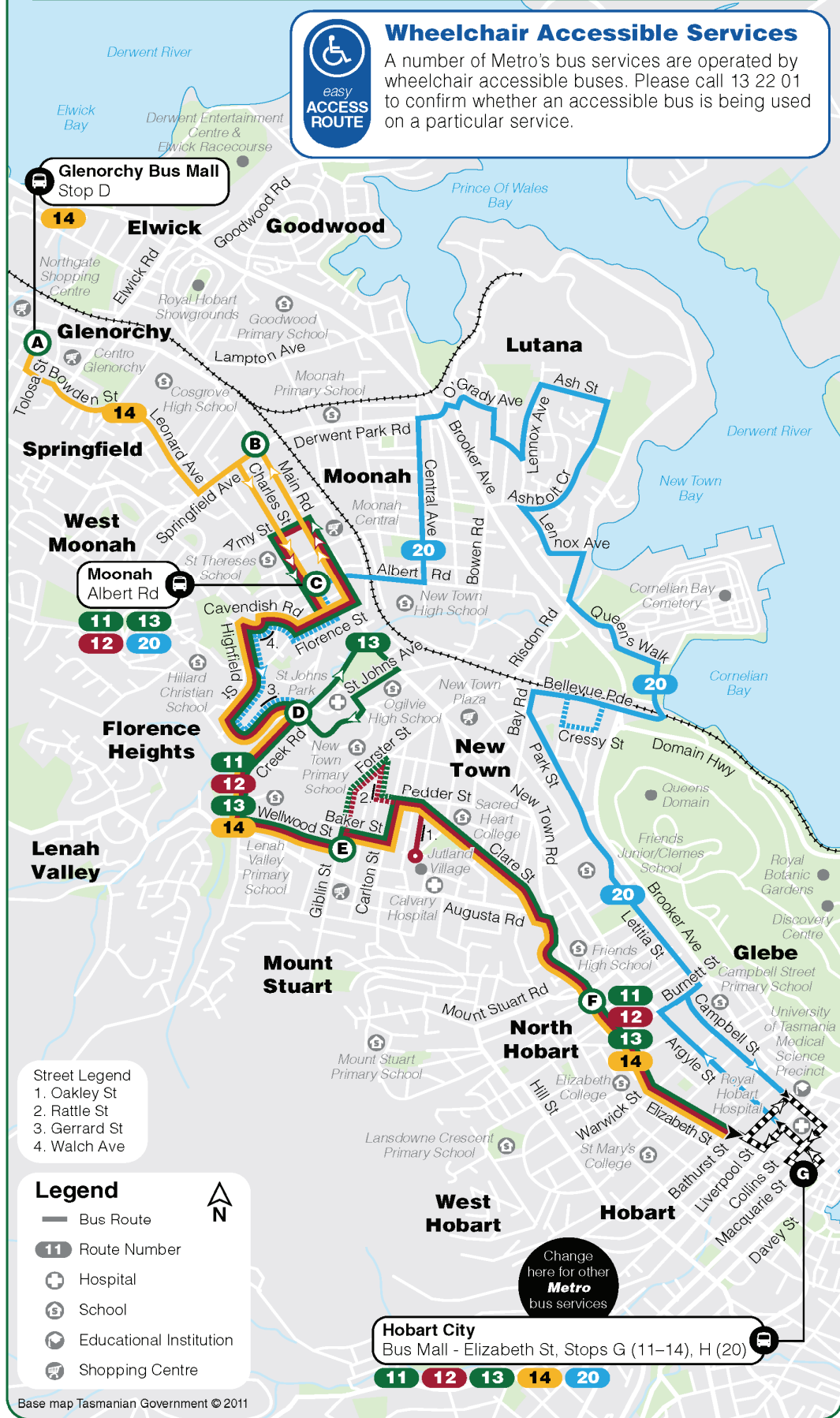
i No service on Weekends or Public Holidays.

Metro Route Map 11, 12, 13, 14 also shows 20



Wheelchair Accessible Services

A number of Metro's bus services are operated by wheelchair accessible buses. Please call 13 22 01 to confirm whether an accessible bus is being used on a particular service.



Base map Tasmanian Government © 2011