



VECTOR

Illuminating Financial Modelling



Knowledge / DSRA

A Debt Service Reserve Account (DSRA) is a common structuring tool for project financings. It provides a cash buffer specifically to protect scheduled debt service in the event of unexpectedly low Cashflow. The rules governing its use are straightforward to explain but like much of project finance financial modelling, the devil is in the detail. The DSRA is an area of project finance modelling responsible for many late nights, circular references, messy formula and unexpected scenario output. This article gives you comprehensive insight into how Nick develops and tests a professional standard DSRA.



By Nick Crawley, Principal

Nick@VectorFinancialModelling.com.au

0416 215 581 / +61 416 215 581



Property of Vector Financial Modelling 2017 ©

www.VectorFinancialModelling.com.au



Introduction

In this article, we introduce developing a Debt Service Reserve Account (DSRA) into a project finance financial model. It is an area of project finance modelling that attracts a lot of error, especially in scenarios and we want to help you get it right. We intend you read this with the accompanying Excel workbook so you can review the layout of the calculations and the actual formula – rather than just read about it.

If you find this useful and you want to understand more about the intention, interpretation and market nuances of the DSRA and how it works in different situations then ask about our two day, 100% hands-on, case study based, Project Finance Analysis course, delivered in person by Nick Crawley.

The DSRA is a senior secured account, usually funded by cash from the outset of a project financing solely for the protection of scheduled principal and interest payments in the event of unexpectedly low cashflow. The DSRA buys the borrower time to manage the cashflows ahead of the next repayment and gives both parties to the loan a more controlled environment to consider restructuring decisions in the event the outlook looks permanently more challenging than expected. If the DSRA is supporting the projects cashflow then the project finance facility will be in Lock-up and steering to avoid Default. The DSRA has a target balance usually equal to the total debt service in the coming [X] months; where X is usually 6 or 12.

To properly build the DSRA into a project finance financial model and test it, we first need to understand its components, how it works in different scenarios, where it 'lives' and how to represent it in key outputs.

DSRA fundamentals

Think of the DSRA as a savings account which must be kept funded to a prescribed amount which can change over time as scheduled debt service changes. The borrower can only withdraw from the DSRA to top-up a shortfall in available cash to cover debt service. The key to successful DSRA modelling is to calculate and treat each of the movements in the DSRA separately:

- Withdrawal: To meet cashflow shortfall
- Withdrawal: To drop target to a lower required target level
- Funding: Initial funding
- Funding: To top-balance up to target level
 - As a result of needing to draw upon it earlier
 - As a result of the target balance increasing

The DSRA generates interest on the cash deposits which is treated in the same manner as interest on Cash at Bank for Profit & Loss and Cashflow statement purposes, although it is shown on its own an individual line. This post doesn't deal with the situation where the DSRA is not a cash-deposit but rather a line of credit – in this case there is no interest earned and there are additional fees to capture.

Calculating the DSRA target balance

The most common way the DSRA target balance is calculated in a project finance financial model is as the sum of the coming [X] months debt service. This value can be derived in a number of ways, each with compromises.

- Manually link up (it doesn't change very often)
- SUMIFS()
- SUM(OFFSET)

Both SUMIFS() and SUM(OFFSET) will give you a dynamic look-forward function however in reality this functionality is only needed during the structuring and term sheet negotiation stage of a project finance transaction. When I am looking for ways to streamline a model, this is an area I can justify hard-wiring; not hard-coding! For example here is the target balance of a 3 month case.

Months	3												
Period		1	2	3	4	5	6	7	8	9	10	11	12
<u>Debt service</u>													
Principal	\$M	15.0	14.0	13.0	12.0		10.0	9.0	8.0	7.0	6.0	5.0	4.0
Interest	\$M	1.8	1.7	1.6	1.4		1.2	1.1	1.0	0.8	0.7	0.6	0.5
Total	\$M	16.8	15.7	14.6	13.4		11.2	10.1	9.0	7.8	6.7	5.6	4.5
Target balance	\$M	43.7	40.3	37.0	33.6	30.2	26.9	23.5	20.2	16.8	13.4	10.1	6.7

Understanding the DSRA line items

The key lines of the DSRA are:

- Initial funding (funds going in)
- Withdrawal to meet a CFADS shortfall
- Withdrawal to meet the target balance (we call this 'draining the DSRA')
- Funding to meet the target balance (we call this 'topping-up the DSRA')

This post is designed to be read closely with the accompanying workbook rather than detail every calculation - when you review you will see that the DSRA has the following lines each with supporting workings.

<u>The account</u>																
Balance b/f	\$M	-	-	-	42.7	41.8	40.9	40.1	39.2	38.4	37.5	36.6	35.8	17.7	-	-
+ Initial funding @ COD	\$M	-	-	42.7	-	-	-	-	-	-	-	-	-	-	-	-
- CFADS shortfall withdrawal	\$M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Target bal: withdrawal	\$M	-	-	-	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(0.9)	(18.1)	(17.7)	-	-
+ Target bal: funding	\$M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balance c/f	\$M	-	-	42.7	41.8	40.9	40.1	39.2	38.4	37.5	36.6	35.8	17.7	-	-	-
Interest earned	\$M	-	-	-	1.07	1.04	1.02	1.00	0.98	0.96	0.94	0.92	0.89	0.44	-	-
DSRA fully funded?	[1,0]															

The key principles behind these lines are:

Funding a CFADS shortfall

Release to fund a cash shortfall = MIN (CFADS shortfall, DSRA Balance b/f)

Where:

$CFADS \text{ shortfall} = \text{MAX}(0, \text{Debt Service} - \text{MAX}(0, CFADS))$

Target: Release

$\text{Top-up} = -\text{MAX}(\text{Target Balance c/f} - \text{DSRA Balance b/f} + \text{Release to fund shortfall}, 0)$

Target: Top-up

$\text{Actual release} = \text{MAX}(\text{Release}, 0)$

$\text{Release} = \text{MIN}(\text{Cash Available to Fund DSRA}, \text{Target DSRA c/f} - \text{DSRA Balance b/f})$

There are some extreme cases which in a perfect world the model would capture but the reality is that in these cases the project is in sweep and the mechanics are somewhat irrelevant. For example, a case that is not captured here "There is a CFADS shortfall, the target balance also falls off due to a following period of significantly lower debt service and the opening balance of the DSRA is not sufficient to meet the shortfall - in theory there is a little extra to be squeezed out of the DSRA to meet a shortfall. However in this event we would consider using Cash at Bank. If the DSRA is not fully funded there is unlikely to be any releases and as a result the project will be in lock-up.

Important notes on meeting the target balance

The target balance and releases to fund cashflow shortfalls are the critical success factors in modelling the DSRA, here are some tips on the mechanics and how they relate to real-life transactions.

1. Debt service and DSRA balances are structured so that a DSRA is only called upon in an unexpected situation.
2. The DSRA being at its target balance is usually a covenant for distributions to subordinated parties.
3. If there is a shortfall in the period and the DSRA is drawn to fund a shortfall then there will be no cash available for topping the target up.
4. If there is a shortfall in the period and DSRA is drawn to fund a shortfall and the target balance is falling then you can theoretically have a plug for debt service shortfall and a release to achieve a falling target. We don't model it this way because if there has been a release from the DSRA to support CFADS, the DSRA would be locked-up by senior lenders.

Nick's cheat sheet

Here are some of the first things I look for as a first pass to see if the DSRA has been properly modelled.

1. Does the sum of the sums of the line items equal zero? They should over the life of the DSRA.
2. Is the DSRA releasing to fund beyond debt service requirements?
3. Is the DSRA causing a circular reference?
4. Is the DSRA finishing up with the life of the loan, too early or too late?
5. Is interest being recognised on the DSRA?
6. In a period of stressed CFADS, including prolonged stress, does the DSRA release correctly all the way to empty? Potentially a moot point as the balance would be swept by senior lenders or receivers in extreme cases.

Success factors

Here are 6 tips for building a professional DSRA into your Project Finance financial model.

1. Be critically transparent, sequential and label lines very clearly – this avoids errors, allows you to debug efficiently (and you will need to!) as well as facilitating a third party understanding of what is happening.
2. Releases from the DSRA all come after the CFADS line.
3. Spend as long testing the model as you do building it.
4. Build the logic up sequentially, sense checking as you go.
5. Be able to completely switch off the DSRA, this makes it much easier to do "with / without" testing and analysis.
6. Target balance "top-ups / releases" being incorrectly prioritised over a release to meet a CFADS shortfall.

Common errors

If you can avoid these you are doing well!

1. Shortfall test is performed on a DSCR that is not purely CFADS / Debt Service in the period. The logic must test "is there sufficient cash in the period to repay the principal and pay the interest that is due in that period".
2. Releases are calculated against total debt service rather than only the shortfall that needs to be fulfilled.
3. The DSRA being drawn <0 resulting in a negative balance!!
4. DSRA releases more than it needs. The DSRA release is limited to the shortfall between CFADS and Debt Service – nothing else.
5. Funding of the DSRA is not modelled as a cash out-flow in the Cashflow.
6. Withdrawal of the DSRA is not modelled as a cash in-flow in the Cashflow.
7. When handling multiple senior repayment tranches not all of the debt service is included in the DSRA target balance.

Avoiding circular references

The DSRA is a magnet for circular references, apart from the initial funding loop, even when you are dealing with advanced debt sculpting / sizing the following points will help you avoid them.

1. Ensure interest is calculated on the DSRA Balance b/f.
2. Don't include DSRA movements above CFADS in the cashflow waterfall.
3. Don't include current period debt service in the target.
4. Don't build interest up within the DSRA.
5. As a last resort manage the target balance profile with a macro.

The DSRA goal seek

There is usually a quite expected circular reference when it comes to setting up the size of the initial funding of the DSRA. The circular reference is due todeep breath....the DSRA target balance being a function of the Principal which is the refinance of the construction facility which includes the initial funding of the DSRA. In most cases we handle this with a simple goal-seek cut and paste macro, which isolates the circular logic. The code is contained in the accompanying workbook and is a simple Goal Seek within a For Next loop.

For i = 0 to 10

Range("DSRA.Funding.Delta").GoalSeek Goal:=0, ChangingCell:=Range("DSRA.Funding.Applied")

Next

This code is linked to the blue button below. If the macro needs to be run then the informative text changes accordingly. In a full model this warning would be linked up to a master test result visible throughout the model.

Initial funding

Required balance (calculated)	\$M	42.66
Balance (solved-value)	\$M	42.66
Delta	\$M	-

The DSRA funding is sized.

Size the initial funding of DSRA

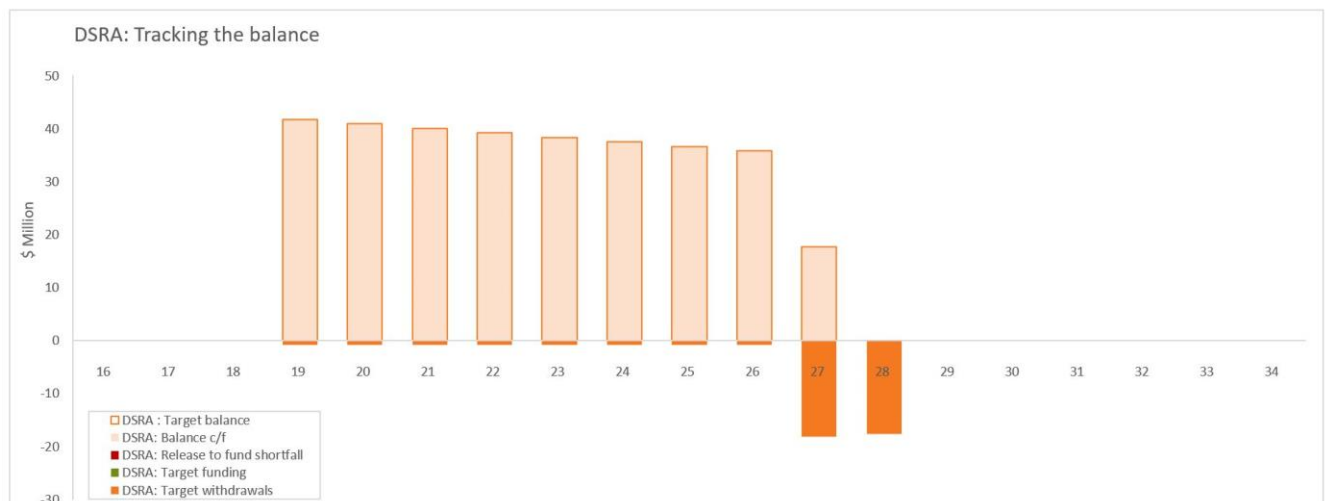
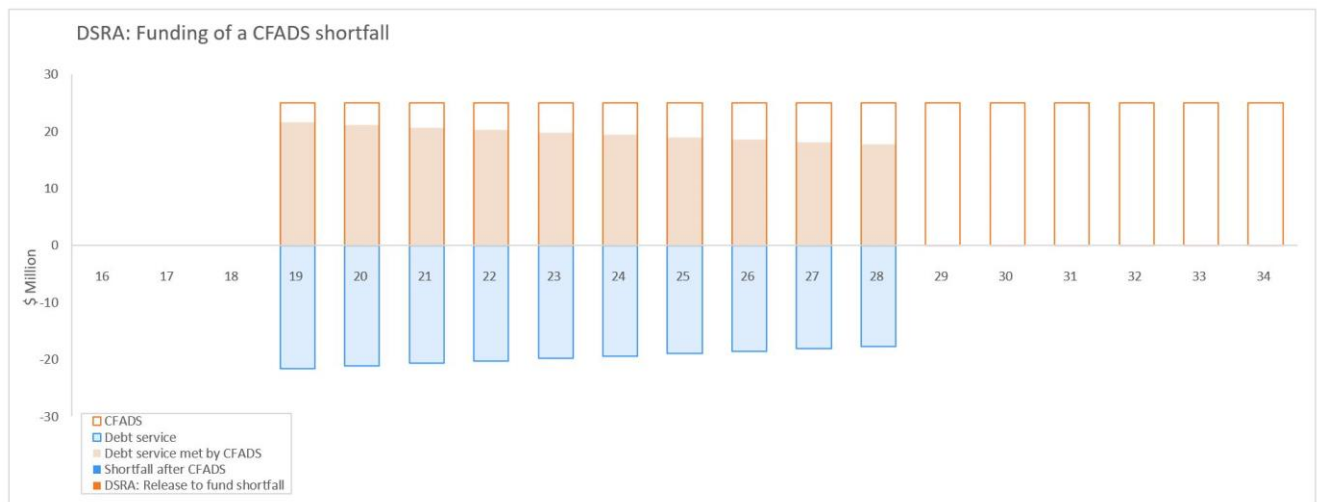
Size DSRA

ALT+F11 to open VBA editor and look at macro.

Worked example 1

- CFADS is constant at \$25M per quarter
- Debt of \$172.85M is repaid over 10 periods, interest rate 10%
- DSRA target balance = 6 months
- DSRA initially funded at \$49.74M

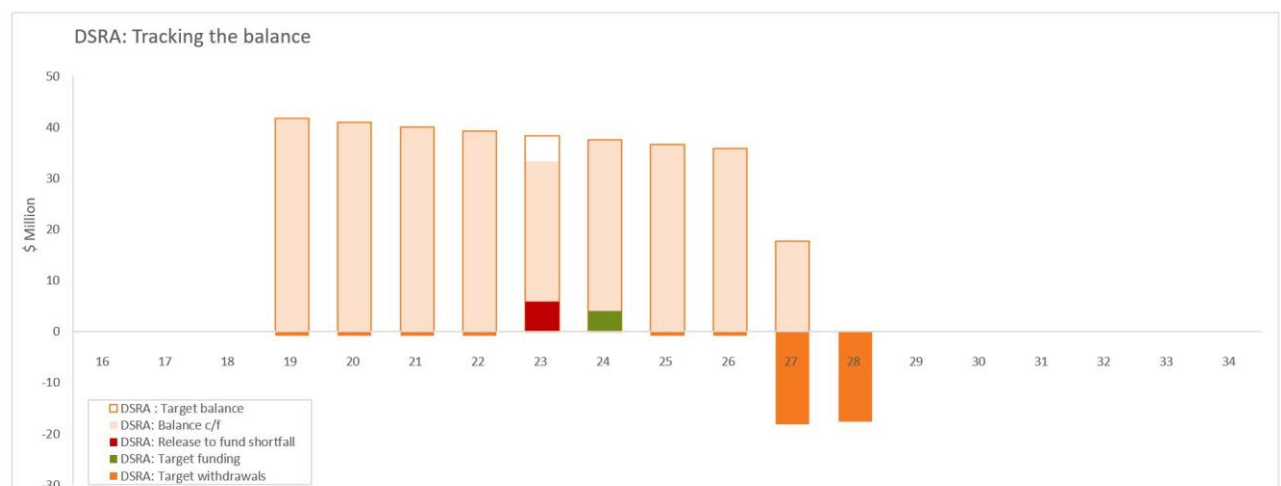
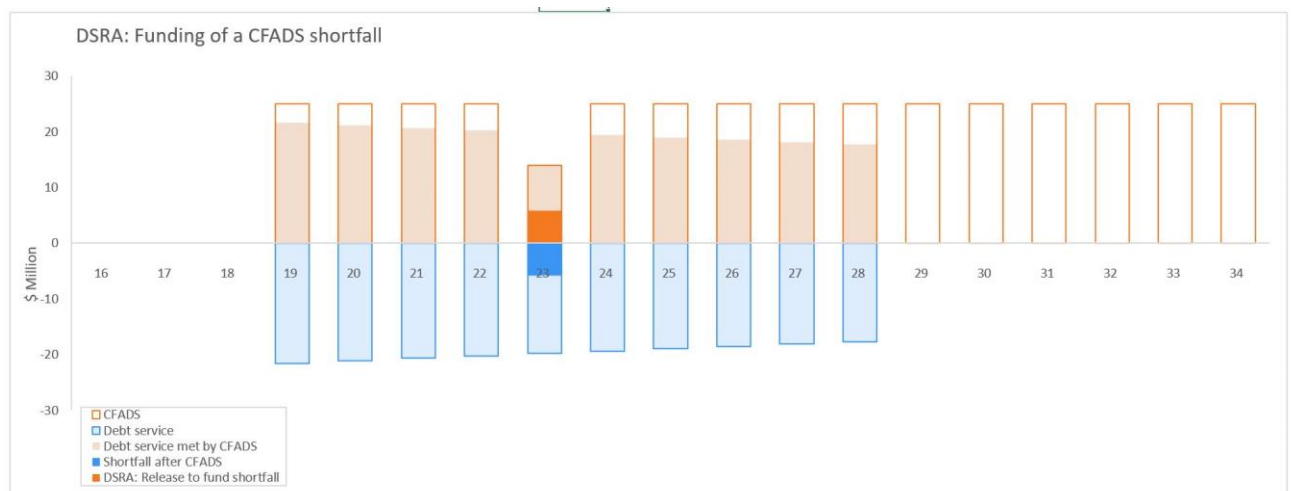
In this situation, CFADS more than covers Debt Service in every period (so no shortfalls) and the only DSRA movements are a gradual release to track the declining target balance, reflective of a constant interest rate on the declining outstanding balance. We can look for this in the plots of movements and balances.



Worked example 2

The same as example 1 but there is sharp drop in the 23rd quarter down to \$14M due to a critical outage.

In this situation, there is a \$5.8M shortfall between CFADS and Debt Service. The DSRA has an available balance of \$39.2M and releases \$5.8M (only) to ensure Debt Service is made. If there was a DSCR which included releases from the DSRA we would see that is 1.00x. This release means there is some catching up to do in the next period to restore the target balance condition – this can be seen in the second plot below, there is the red release to fund a shortfall followed by the green restoration of the target balance.



Summary

The DSRA is notoriously tricky to model correctly and even if we see a model with the Base Case working they often fail in scenarios, this includes model that have been "audited"! To model and test a DSRA thoroughly as part of a model with integrated financial statements we allow for around half a day.

I hope that was useful – smooth and happy modelling!

