



Transport
Asset Standards
Authority

Asset Standards Authority

Electrical Concessions

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Scope

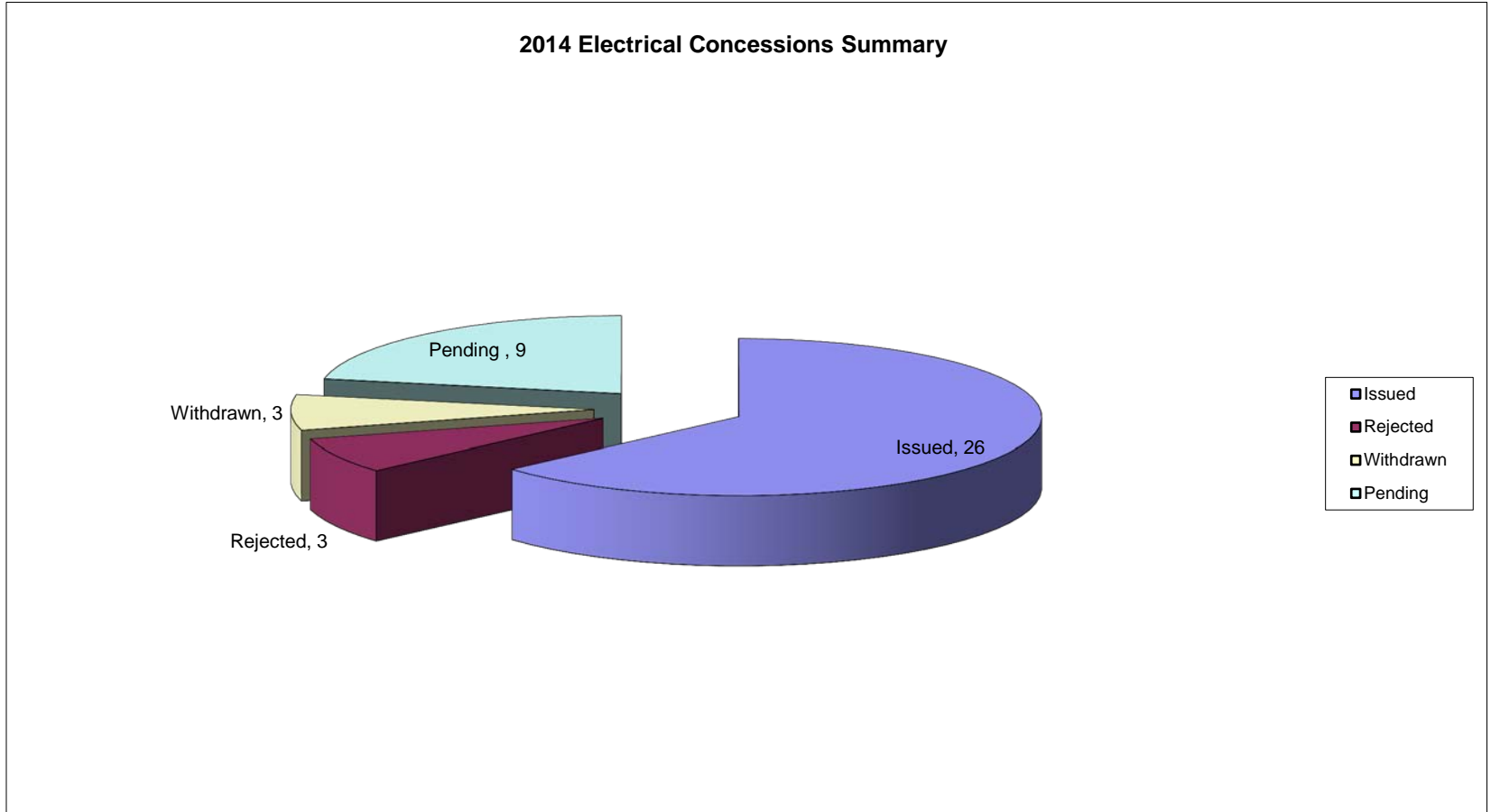
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- 2014 Electrical concessions summary
 - ❑ Earthing & Bonding concessions
 - ❑ Overhead Lines & Cables concessions
 - ❑ Substations and LV concessions
 - ❑ HV Network concessions
- Review of the Concessions Standard TS 10765
- Comments on Request for Concession form TS 10765 F1
- Comments on concession requests
- Concessions - Risk Assessments
- Conclusion
- Questions

Introduction

- Concessions are deviations from the ASA standards
 - ❑ Transport standards (ASA & RailCorp)
 - ❑ General drawings
- Standards can not cover all situations or potential possibilities
- Concessions that fill the gaps are beneficial
- Concessions that benefit TfNSW are good
- Concession reviews are based on technical merit and value for money - SFAIRP
- Early engagement is the key

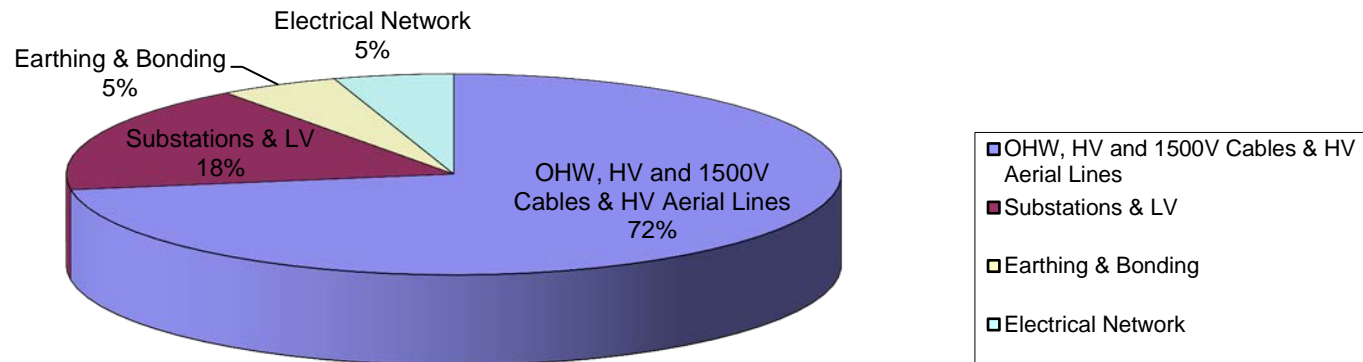
2014 Concessions Summary

- Total 41 requests for electrical concessions received



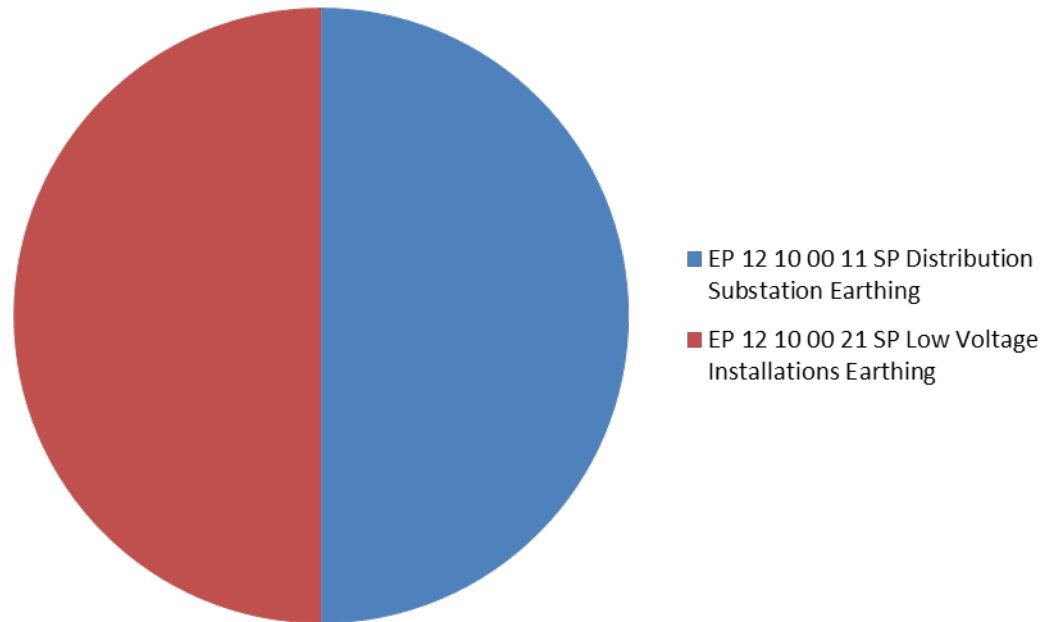
2014 Concessions electrical discipline breakdown

Summary of 2014 Electrical Concessions



Earthing & Bonding

- Total of 2 concessions



Earthing & Bonding

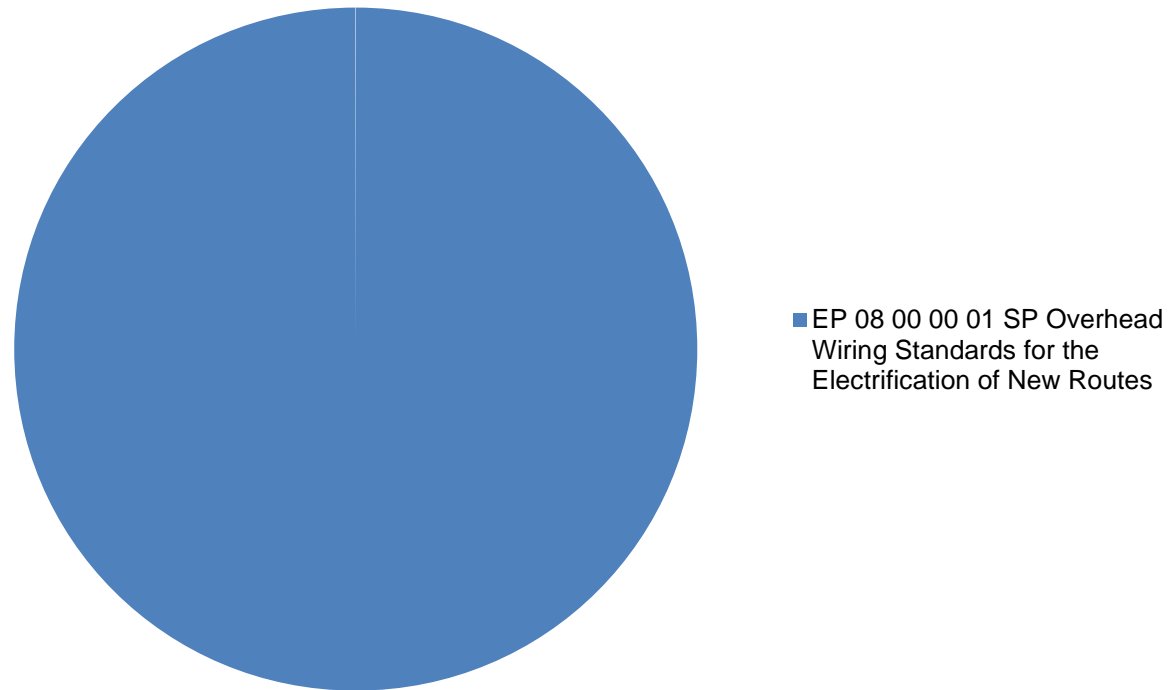
Summary of concessions:

- ❑ Low voltage earthing resistance higher than 15Ω (22Ω) at Dulwich Hill padmount substation
 - ❖ Due to poor earth conditions
 - ❖ There were limited site options
 - ❖ Acceptable SFAIRP

- ❑ No isolation transformer installed for each lighting circuit on 1500V OHW structures at Hornsby Maintenance Centre & Stabling Yard
 - ❖ Still under consideration
 - ❖ Significant technical issues

OHW

- Total of 12 concessions



OHW

Summary of concessions:

- ❑ Use of conductor system categorised as “not for future use”
 - ❖ Conductor systems defined in EP 08 00 00 16 SP
 - ❖ Purpose is to drive OHW system types to current approved systems
 - ❖ Used for replacement of storm damaged OHW
 - ❖ Used mostly on existing infrastructure (structures)
 - ❖ Interface issues with existing system
 - ❖ Acceptable outcome SFAIRP

- ❑ High stagger (modifications to existing OHW)
 - ❖ Technical issues concerning structure placement
 - ❖ Acceptable outcome SFAIRP

OHW

- ❑ Excessive tension loss
 - ❖ Calculated tension loss outside of standards (both number of structures and tension loss)
 - ❖ Project already at CDR stage
 - ❖ Contract variations if required to rework
 - ❖ Not the best outcome
 - ❖ Standard to be modified to use tension loss only (7%) and not use maximum number of structures (currently 15)

- ❑ Use of fixed knuckles in regulated OHW
 - ❖ Technical difficulties with structure placements to use pull off arm to register wiring
 - ❖ Knuckle locations marginally outside of standards
 - ❖ Acceptable SFAIRP

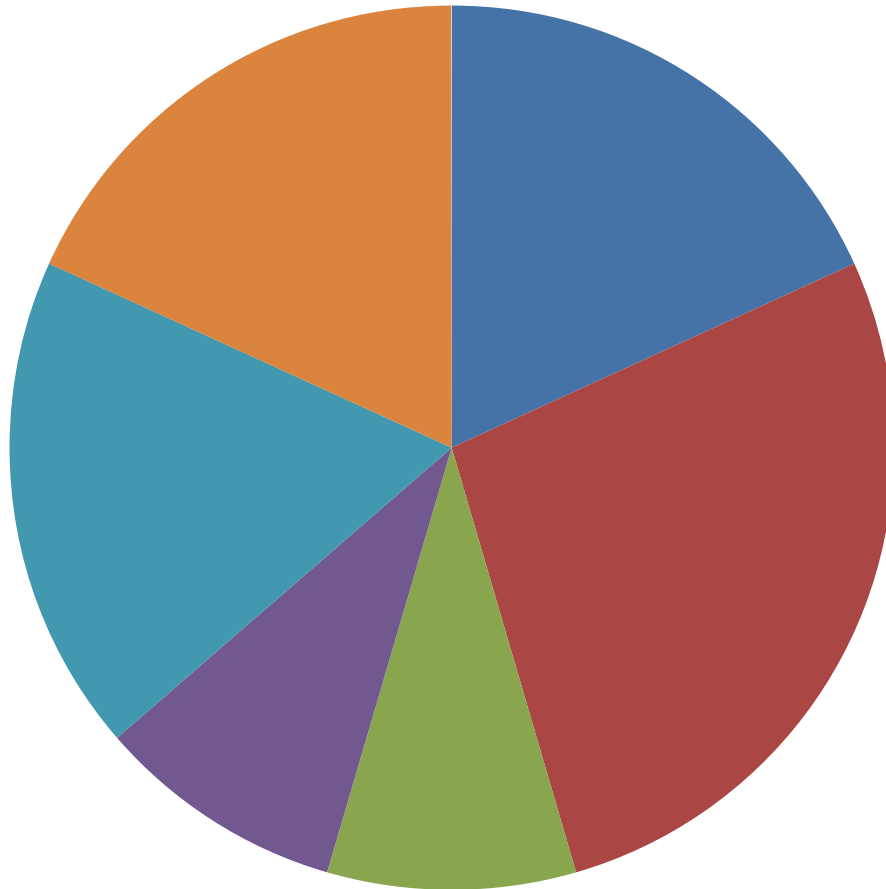
OHW

- ❑ Use of contact wire full splice for staging works
 - ❖ Standard currently does not allow full splices to be used in main line OHW for new works
 - ❖ Standard to be amended to allow for use of contact wire full splices in main line OHW as part of staging works
 - ❖ Acceptable SFAIRP

- ❑ Low wire heights (adjustment of fixed anchored OHW to suit track works in yards and tunnels)
 - ❖ Driven by urgent works following a derailment
 - ❖ Old existing OHW on polygon arrangements
 - ❖ Unable to adjust OHW to EP 08 00 00 01 SP within the given timeframes
 - ❖ Acceptable SFAIRP

HV and 1500V Cables

- Total of 11 concessions



- EP 20 00 04 02 SP - Underground Installation Configurations for High Voltage and 1500 Vdc Cables
- EP 20 00 03 01 SP - HV and 1500V DC Cables - Joints and Terminations
- EP 20 00 04 05 SP - Cable Pits
- EP 20 00 00 20 SP - Testing of High Voltage and 1500V DC Cables
- T HR EL 20002 ST - 1500 V DC Cables and Cable Ratings
- T HR EL 20001 ST - High Voltage AC and 1500 V DC Traction Power Supply Cable Requirements + EP 20 10 00 02 SP - High Voltage Cable

HV and 1500V Cables

Summary of concessions:

- ❑ Shallow cable depth
 - ❖ Common occurrence
 - ❖ Normally technical or physical constraints
 - ❖ Additional controls required to minimise risk of damage due to excavation etc
 - ❖ Acceptable SFAIRP
 - ❖ Proposed to amend standard to allow for AEO JOS determination

- ❑ Use of non-type approved cable accessories (2kV cables & 1500V negative cables)
 - ❖ Normally a type approval
 - ❖ Short lead time for project
 - ❖ Temporary arrangements
 - ❖ Acceptable SFAIRP

HV and 1500V Cables

- ❑ Cable pits located close to rail (number of locations)
 - ❖ No AEO endorsement (engineering assurance)
 - ❖ Rail safety risks introduced
 - ❖ Not ALARP
 - ❖ Not a good outcome for Transport

- ❑ 1500V feeder rating
 - ❖ Standard requires OHW feeder cables to match the rating of the OHW
 - ❖ Request was based on power studies (for 2013 timetable)
 - ❖ Design had been completed
 - ❖ AEO technical calculations were not valid
 - ❖ Outcome will result in rework well before life expiry of the cables
 - ❖ Not a good outcome for Transport

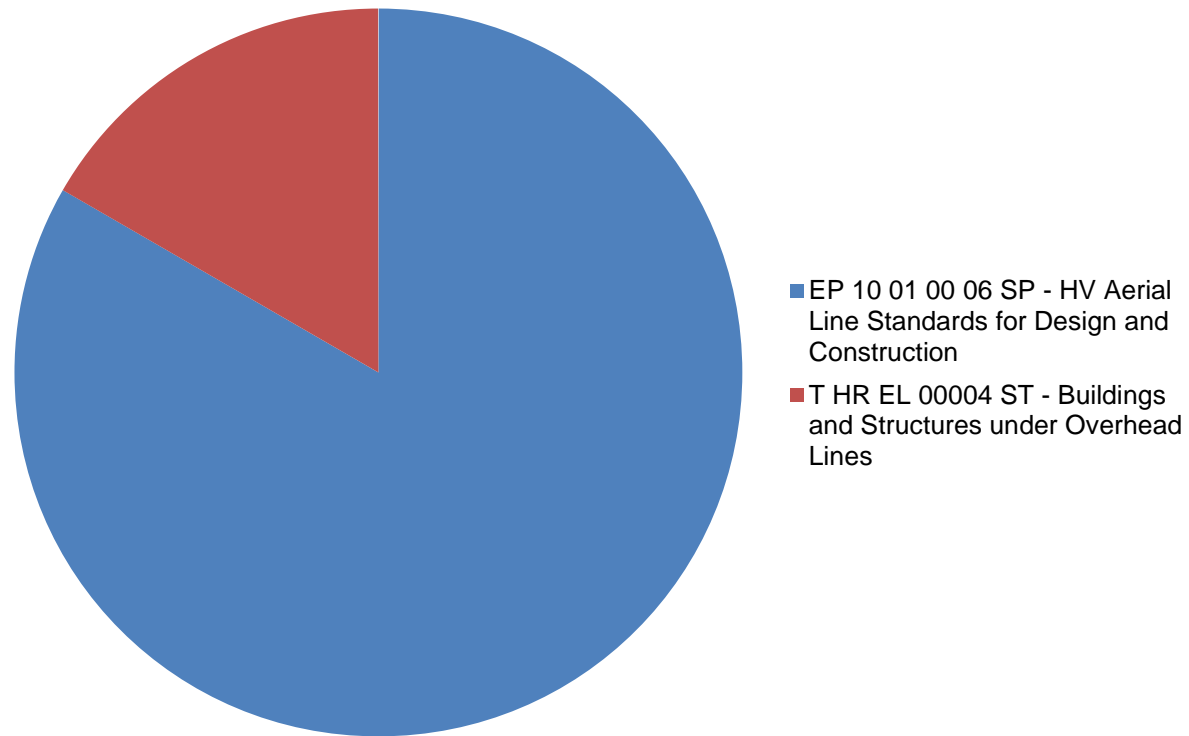
HV and 1500V Cables

- ❑ Use of XLPE insulation (in lieu of TR-XLPE)
 - ❖ Small section installed in existing cable
 - ❖ Short project timeframe
 - ❖ Acceptable SFAIRP

- ❑ Low screen to earth test results (temporary)
 - ❖ Found during final commissioning tests
 - ❖ Monitoring controls put in place
 - ❖ Acceptable SFAIRP
 - ❖ Longer term solution required

HV Aerial Lines

- Total of 6 concessions



HV Aerial Lines

Summary of concessions:

- ❑ Building constructed under HV aerial line
 - ❖ Late submission by project
 - ❖ Submission bypassed AEO
 - ❖ Subsequently not endorsed by AEO
 - ❖ Concession not issued

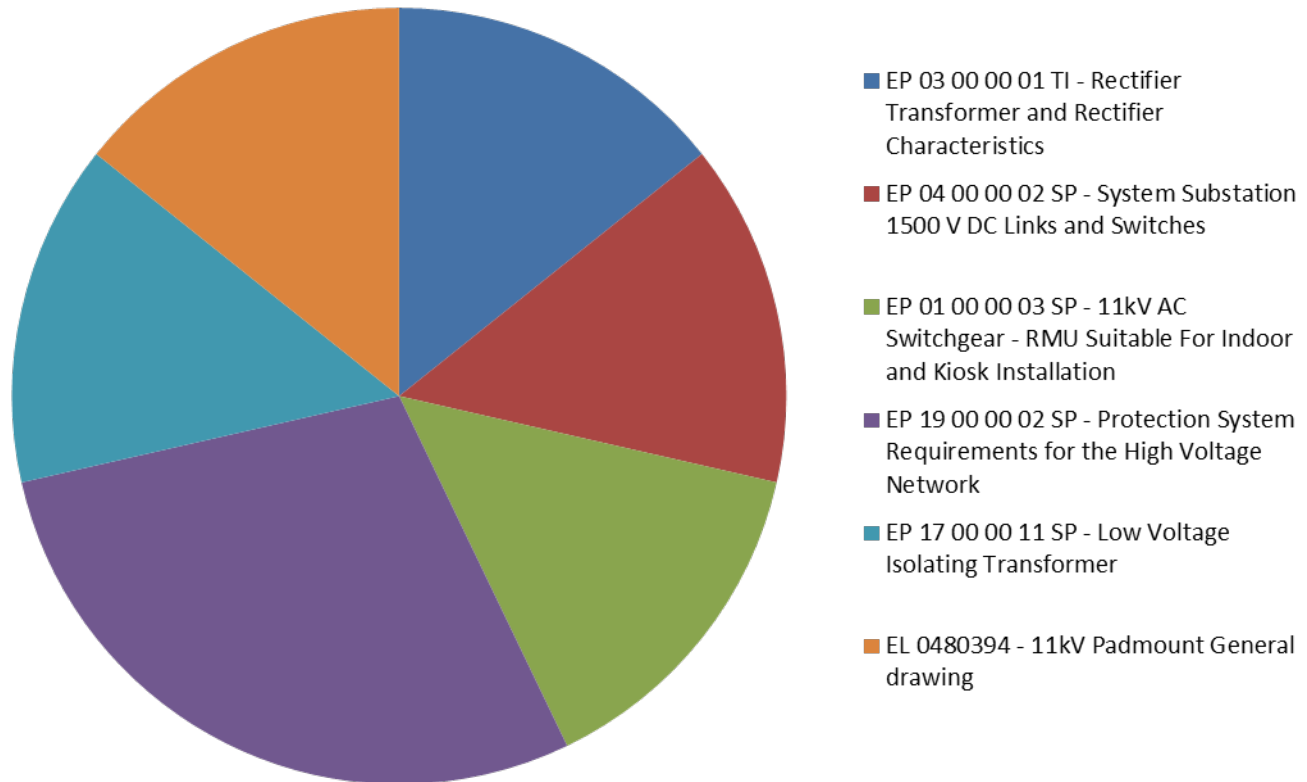
- ❑ Extent of overhead earth wire from a substation less than 800m
 - ❖ Geographic issues with location
 - ❖ Interface issues with other projects
 - ❖ Acceptable SFAIRP

HV Aerial Lines

- Length of cable between two aerial sections less than 500m
 - ❖ Common occurrence
 - ❖ Normally based on cost issues only
 - ❖ Does not normally address the larger Transport network risk profile – project specific only
 - ❖ Most acceptable SFAIRP
 - ❖ Standard to be amended:
 - Exclude 11kV
 - 33kV amended to between 100m and 500m
 - 66kV remains at 500m
 - Higher the voltage, the tighter the restrictions
 - Analysis documented in the concession

Substations & LV

- Total of 7 concessions



Substations & LV

Summary of concessions:

- ❑ For a standard 11kV padmount substation, allowing for a cable pit instead of conduits for 11kV cables
 - ❖ Allows for easier installation of cables
 - ❖ Good outcome
 - ❖ General drawings to be updated

- ❑ Substation to be commissioned without a DC Harmonic Filter
 - ❖ Request submitted after design completed
 - ❖ Request not sufficiently justified - AEO had not tested the market
 - ❖ AEO requested to provide further information
 - ❖ Information still pending

Substations & LV

- ❑ Substation to be commissioned without SCADA indication on the 1500V feeder/rail connecting switches
 - ❖ Request submitted after design completed
 - ❖ Request not sufficiently justified - AEO had not tested the market
 - ❖ AEO requested to provide further information
 - ❖ Information still pending

- ❑ Installing a standard 11kV RMU with an internal arc classification of AFL as opposed to AFLR
 - ❖ Commercially available units only AFL
 - ❖ Standard deemed too restrictive
 - ❖ Standard amended with a Technical Note
 - ❖ Good outcome

Substations & LV

- ❑ Providing limited backup protection on the 2kV system as a temporary measure
 - ❖ Staging requirement for project
 - ❖ Cost to comply and excessive
 - ❖ Acceptable SFAIRP

- ❑ Concession request for an isolation transformer (incorrectly submitted – should have been a type approval)
 - ❖ Rejected as concession and resubmitted as a type approval

- ❑ Concession request for non standard 33kV voltage transformer to be used for supply authority metering (incorrectly submitted – should have been a type approval)
 - ❖ Rejected as concession and resubmitted as a type approval

Electrical Network Safety Rules

- Sydney Trains using ASA's concessions process
- Total of 2 concessions
- Both associated with Wallerawang Transgrid transmission substation
- Allowed usage of Transgrid Safety System in lieu of Sydney Trains ENSR
- ASA SME prepare and issued the concessions based on Electrical Distribution Unit (within Sydney Trains) SME advice

Review of the Concession Standard TS 10765

- ASA will shortly release an update to the Concessions Standard
- Will include
 - Concessions
 - Non conformances
 - Rejection
- Early engagement is the key

Review of the Concession Standard TS 10765

Concession

- A properly engineered solution to an unfortunate situation where all the requirements of the standard cannot be met, and a compromise is unavoidable.
- An innovative solution that meets the intent of the standard, but is not strictly in compliance with the standard.

Review of the Concession Standard TS 10765

Non Conformance

- Occasionally systems, processes, designers or contractors fail
- The result can be a situation where ASA Standards have not been met, but it is too late or too costly to change.
- The TfNSW representative must agree with the conclusion that rectification is not possible or cost effective.

Review of the Concession Standard TS 10765

- Non Conformance is treated as an incident and subject to investigation:
 - What went wrong to lead to this situation
 - What is going to be done to prevent this or similar situations from occurring again
 - What risks have been left as a result of this situation and how are they going to be managed in the long term
- A non conformance does not comply with ASA Standards and may result in contract variations or penalties.

Review of the Concession Standard TS 10765

Rejection

- Where a concession request does not adequately address risk to ALARP or SFAIRP levels then it will be rejected

Request for Concession Form TS 10765 F1

- The form is available on the ASA website
- Fill the form in fully
- Clearly nominate what part of the standard cannot be complied with
- Explain why the standard cannot be complied with
- Detail the options considered
- Ensure there is a fully documented risk assessment (included or attached)
- Make sure the form is signed by persons with the appropriate AEO or organisational delegation

Comments on concession requests

- Compliance with standards and general drawings should be determined at the Concept or Preliminary Design Stage (start the concession process early)
- Concessions should be used for cost reduction over technical compliance SFAIRP
- Concessions should not be used for Type Approvals
- Early engagement is the key

Concessions - Risk Assessments

- Submitted risk assessments are presently sub-standard (do not address all risks)
- Risk assessments are to be based on whole of life risk not solely on project risk – for concessions the risk is to Transport not your project
- Risk assessments should use the Transport TERM matrix for quantification
- Proposed risk mitigation strategies should be clearly identified in the risk assessments

Conclusion

Concessions should be viewed as a good thing when used appropriately

They allow for:

- Situations not covered by the standards
- Innovation
- The use of new technologies

Remember.....

Early engagement is the key!!!!!!!

Questions?

