



global Transport Knowledge Partnership

Southeast Asia Community Access Partnership SEACAP

**LOW VOLUME ROADS WORKSHOP
Napier, New Zealand, July 2009**

Low Cost Structures Manual

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Current Situation

- Basic road network is essential for economic development in low income countries
- Roads often passable for 95% of their length, but impassable at a water crossings
- Low volume road manuals usually only have a 'chapter' on structures
- Proven materials options such as masonry, brick, timber are usually ignored



Problems

- Insufficient attention has been paid to the use of local resources, proven materials and indigenous skills
- Locally trained engineers have often undertaken civil engineering courses based on European/US university syllabuses, standards & best practices.
- Lack of access to /availability of local 'design data'
- No 'standard' designs
- Many structures poorly designed & constructed
- Limited resources not used effectively



Issues To Be Addressed

- Increasing the level of construction of low cost and readily maintainable structures on rural roads (spot improvement strategy)
- Increased workload for, local labour, artisans and contractors
- Increased use of local materials and demand on local suppliers and material manufacturers
- Introduce appropriate standards & specifications with alternatives to reinforced concrete
- Improved maintenance of structures



Requirements of the Manual

- The manual is aimed at private contractors and consultants, local government highways departments and other organisations involved in Low Volume Rural Road infrastructure provision.

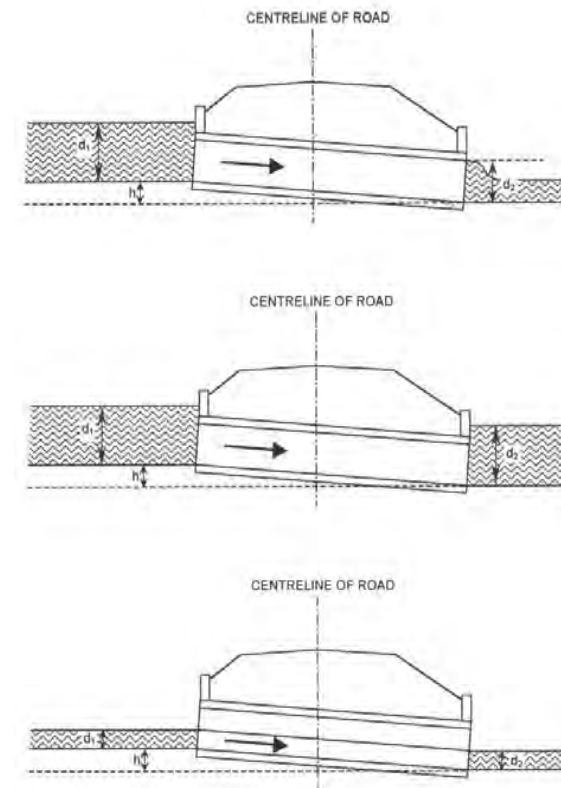


- Credibility of the manual with potential users through the involvement of project partners
TRL IRF
gTKP SEACAP

- Applicable world wide – draft manual draws on case studies from 5 diverse countries
- All information contained in 1 manual (2 volumes design & drawings)

Aims of the Manual

- Concise and complete information in one place
- Provide the engineering background required to
 - Complete planning and assessment
 - Select the correct structure
 - Complete design
- Guidance on costing, construction and maintenance of structures
- Assist in the approval and adoption of low cost structural designs
- Utilisation of low cost labour, local materials & artisans
- Improving economic returns and reducing environmental impacts by using local resources

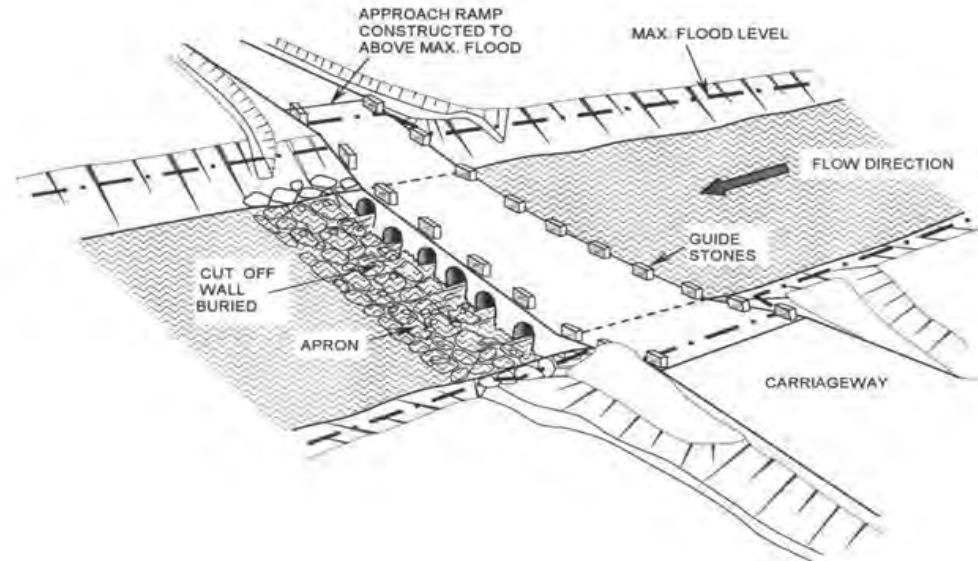


Volume 1 Design Manual

- Scour
- Foundations
- Structural slabs
- Cut off walls
- Pipes
- Headwall and wingwalls
- Apron
- Approach ramps
- Downstream protection
- Arches
- Bridge design

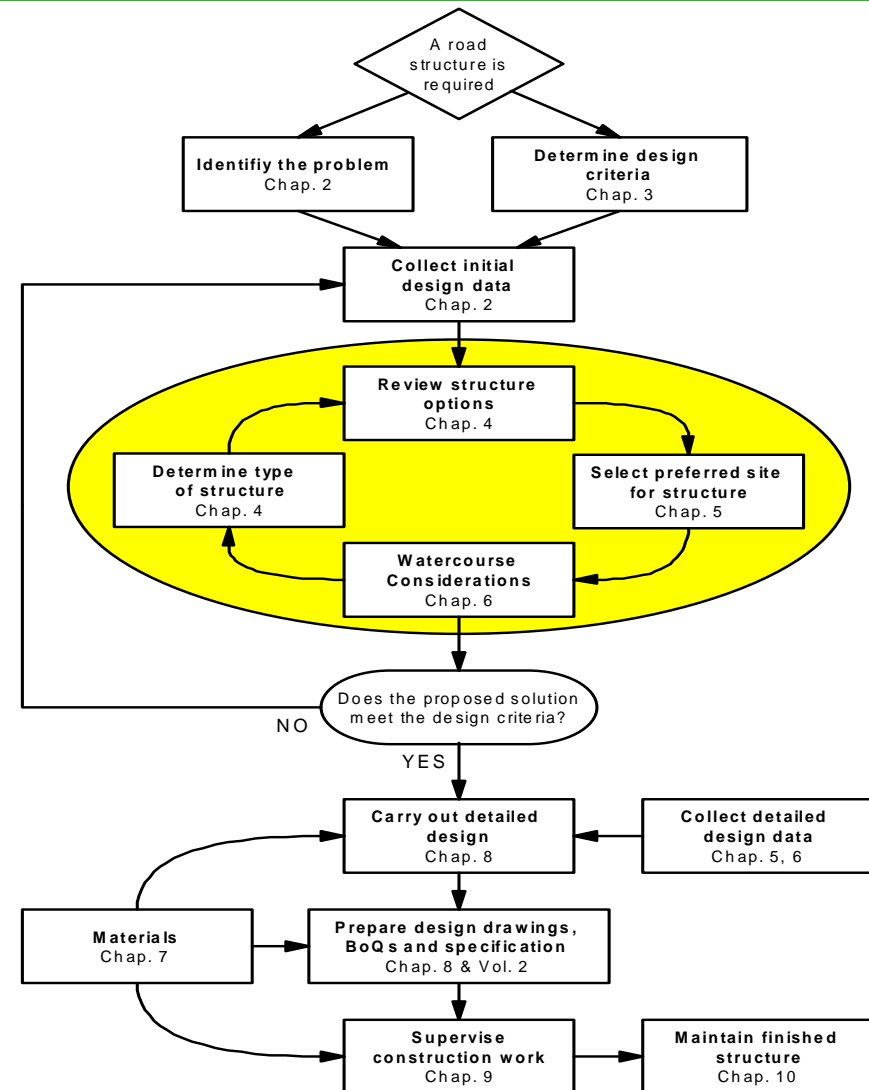
Volume 2 Standard Design Drawings

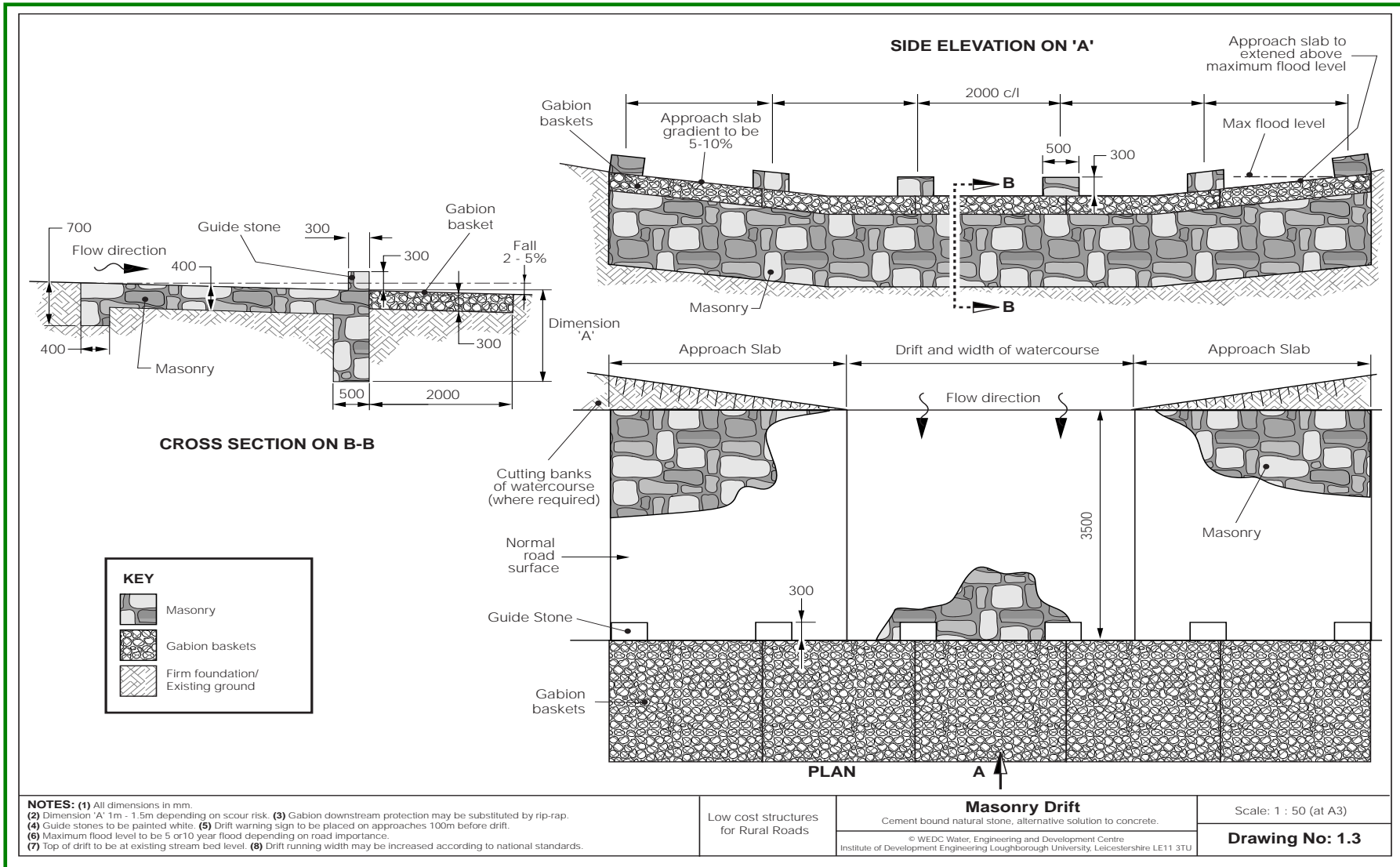
- Drifts
- Simple culverts
- Vented fords
- Large bore culverts
- Small bridges

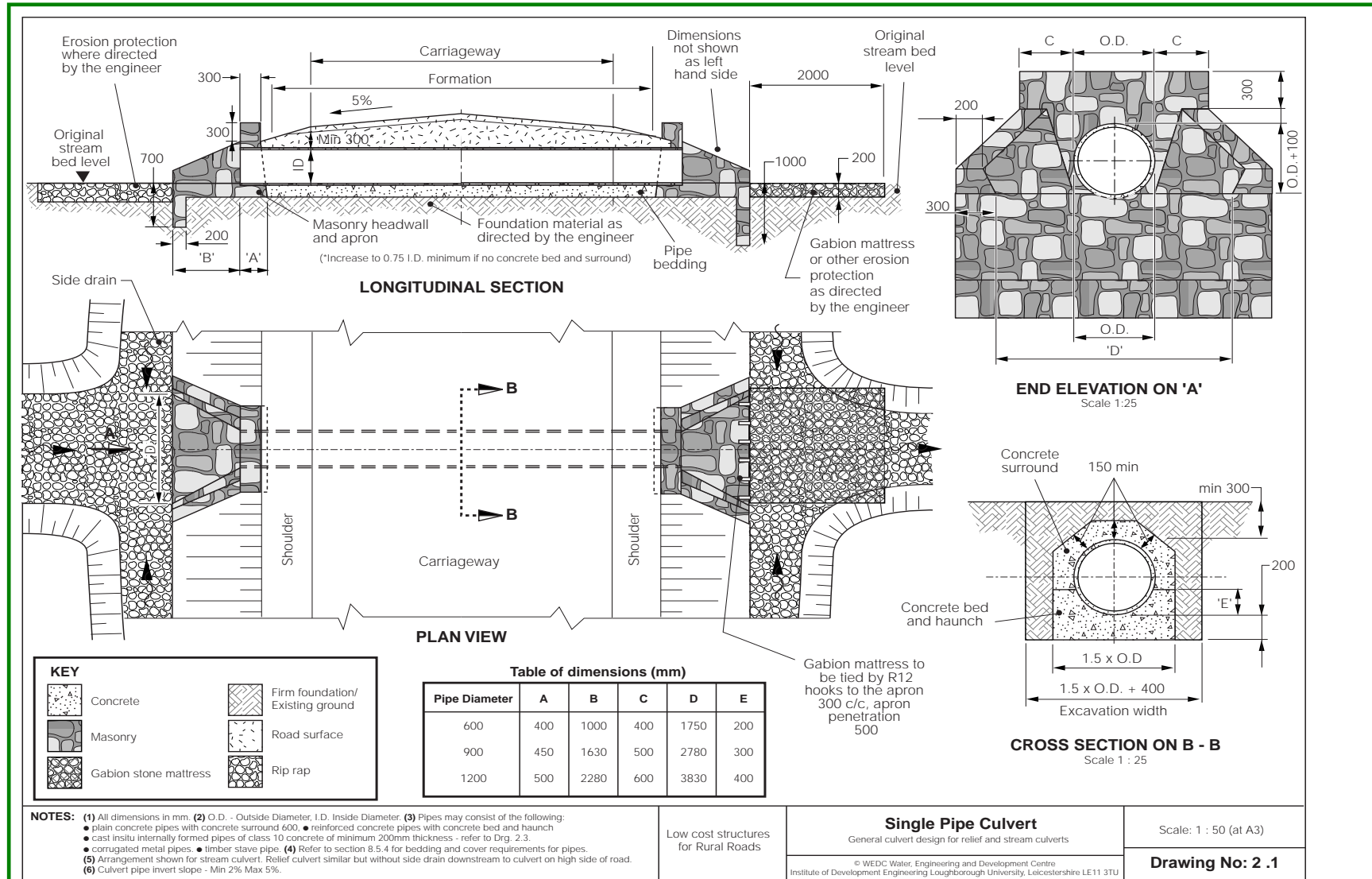


Volume 1 Design Manual

1. Introduction
2. Project Planning
3. Design Criteria
4. Structural Options
5. Site Selection and Appraisal
6. Watercourse Characteristics
7. Materials
8. Structural Design
9. Construction
10. Maintenance







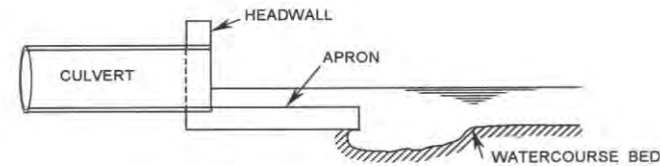
Next Steps

- Obtain practitioners comments on web published manual by October 2009

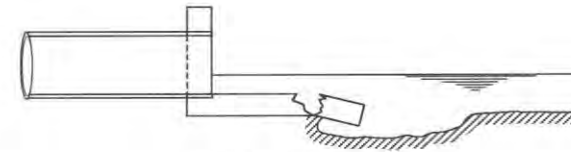
Visit

www.gtkp.com/sectors.asp?step=4&contentID=3319

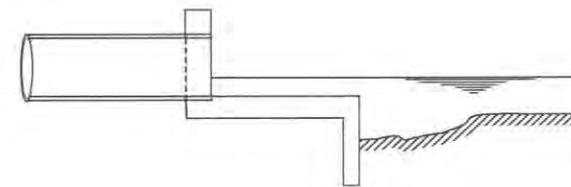
- Review and incorporate comments into final published version of the manual
- Training / mentoring of local engineers
- Demonstration of standard designs
- Review of designs against national standards and specifications
- Review of engineering curricula



WATER STARTS TO UNDERCUT UNPROTECTED APRON



UNDERCUTTING CONTINUES RESULTING IN BROKEN APRON



CONSTRUCTION OF A CUTOFF WALL PREVENTS DAMAGE

Further Information

The following dissemination forums support Low Traffic Volume Rural Roads (LVRR) knowledge in the REAAA region:



global Transport Knowledge Partnership:

www.gtkp.com

SEACAP Southeast Asia Community Access Partnership:

www.seacap-info.org