Strategic Directions – Encouraging the National Uptake of Source Control SUDS

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Content

- Phases 1 and 2 – Background Research
  - Phase 1 – History: where , why / what for?
  - Phase 2 - Delivery : Globally / Scotland
- Phase 3 Evaluation
  - Workshop / Surveys Findings
- Recommendations
  - What did we learn from it all?

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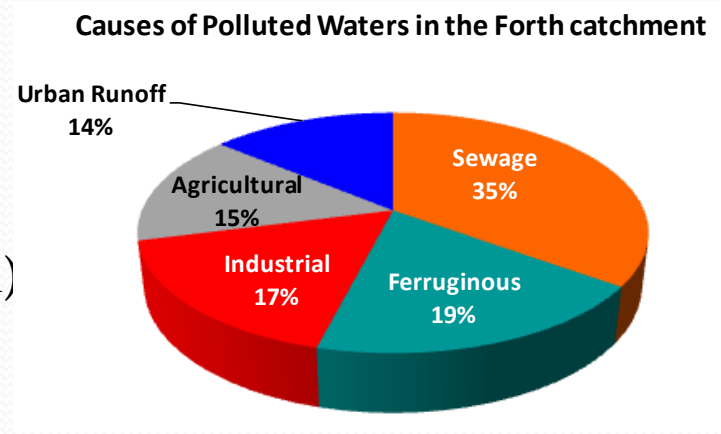
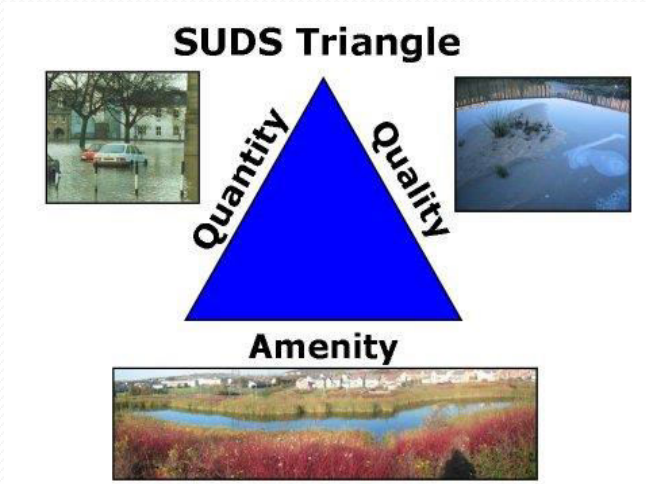
Phase 1- History

- Early 1990s SC developed based on different concepts in UK
  - **Pollutant control officials** - Housekeeping SC
  - **Hydrologists** – Hydrological SC (groundwater recharge, flood mitigation)

- **Water quality drivers** more important in Scotland (FRPB study) - urban drainage / cross connections significant cause of **diffuse pollution**
- Introduce pollution control techniques from US – **BMPs**!





- Rio earth Summit - introduction of **environmental** and **amenity** drivers –
- **SUDSWP** and **SUDS triangle** (quality / quantity / amenity + biodiversity) born.

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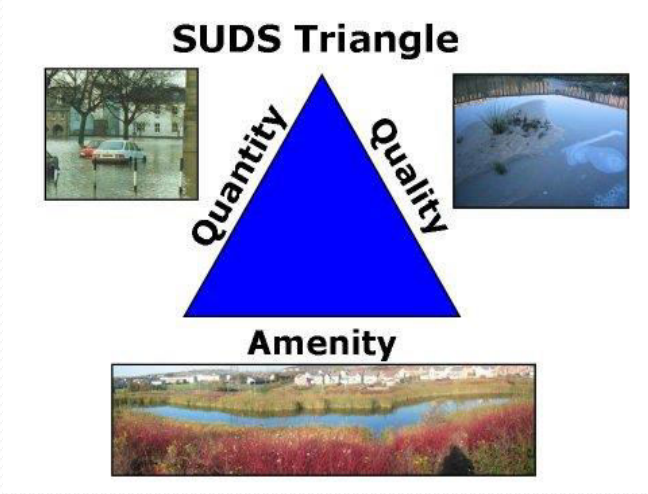
Phase 1- History



•SUDS triangle 1998.

•CIRIA C521 (2000) – SUDS manual introduces **stormwater treatment train concept** - 3 levels of treatment depending on pollutant risk – higher risk (i.e. roads industrial estates), the more levels of treatment required.

• **Its at this point that things become confusing - 3 levels of treatment** (source, site, regional) has become confused with **3 benefits** (quality, quantity, amenity) of SUDS triangle…….Developers believe that if they are providing all 3 benefits of the SUDS triangle then also satisfying 3 levels of treatment train!

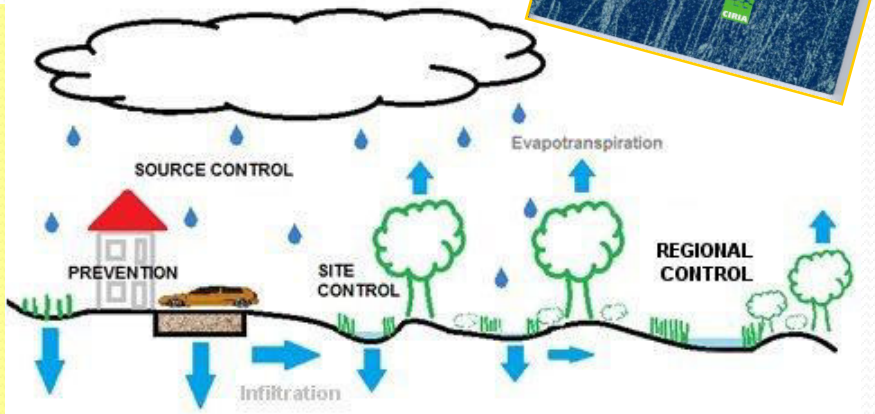


Image courtesy of Jamie Taylor

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Phase 1- History

Feature	Conveyance	Function	Application	Comments
Permeable pavement	N	All	All	Stone fill base must have sufficient storage volume
swale	Y	All	H, S, Li, CPL	Filtration. Can absorb soluble pollutants in soil in low flows especially (detergents etc)
Filter strip	N	P, A, E (P, GR: limited)	All	As above. Topsoil is beneficial for pollutant degradation, as is exposure to sunlight.
Biofilter	N	All	R,S, Li, CPL	As above
Rain garden	N	All	R,S, Li, CPL	Large area needed to store water during winter months
soakaway	N	All	R, Li, CPL	By-passes top soil where adsorption & biodegradation optimal. Not suitable for contaminated land.
Waterbutt	N	F	R, Li, I, CPL	zero storage when full
Geocellular	Y (possible if under-drained)	F, GR	R, S, I, Li, CPL	Can be installed on a plot by plot basis, e.g. beneath lawn or driveway.
Filter drain	Y	All	All	Volume (void space) critical for flow attenuation
Rainwater harvesting	N	F (P: limited)	R, I, Li, CPL	Limited water quality treatment
Green roof	N	P, A E (F: limited)	R, I, Li, CPL	Limited storage volume
Green wall	N	P, A, E (F: limited)	R, I, Li, CPL	V. Limited storage volume
Tree planters / tree pits	Y (if linked by under-drain)	All	R, S, Li, CPL	Storage volume limited in planter; frontier techniques
Planted rills	Y (?)	All (Limited F: P, GR	R, Li, CPL	Filtration. Can absorb soluble pollutants in soil in low flows; invalidated frontier technique
Infiltration trench	Y	All	All	Ideal where soil conditions favourable / low pollution risk
Schotterasen (gravel turf)	N	P, GR, A, E	R, Li, CPL	Ideal where soil conditions favourable and low pollution risk; frontier technique

Key:

Conveyance: Y = yes; N = no. Function: P = Pollution control; F = Flood risk management; GR = Groundwater Recharge; A = Amenity; E= Ecology. Application: R = Residential; H = Highway; S = Streets; I = Industrial; Li = Light Industrial; CPL = Commercial / Public / Leisure.

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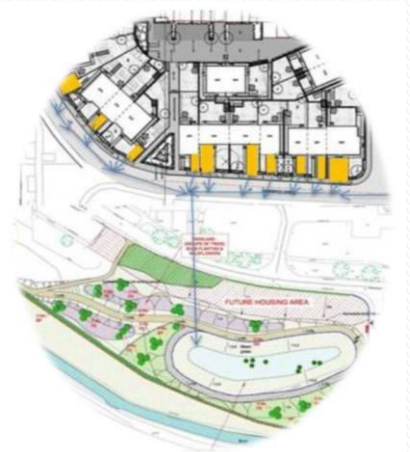
Phase 1- History

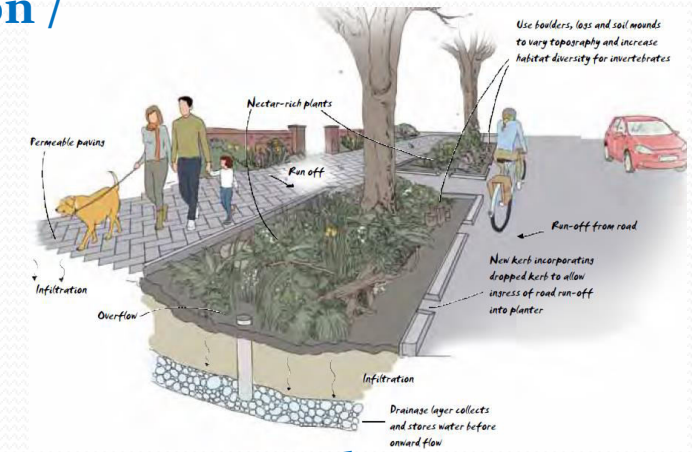
Research

Opportunities



Regeneration / Retrofit

Unit Plot



Local Streets

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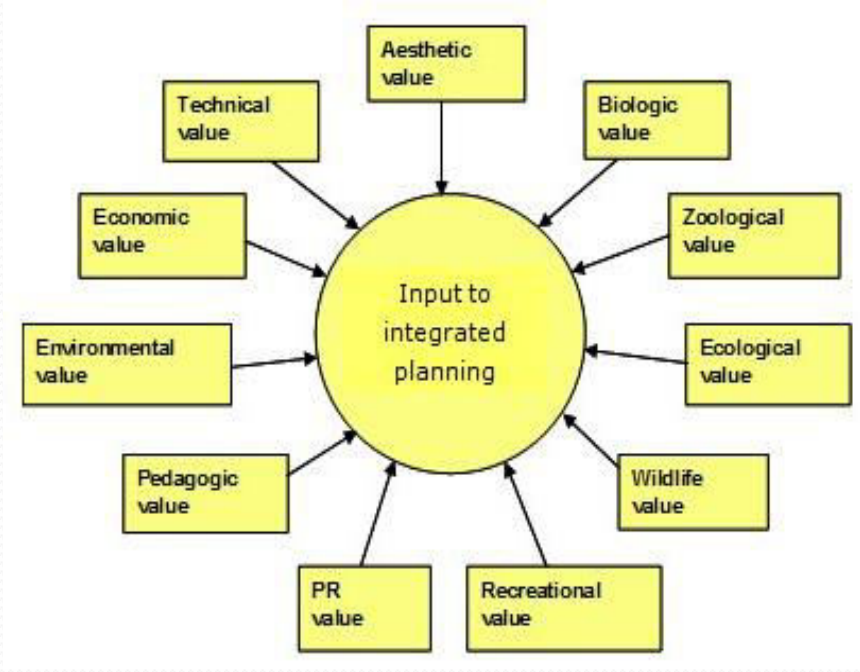
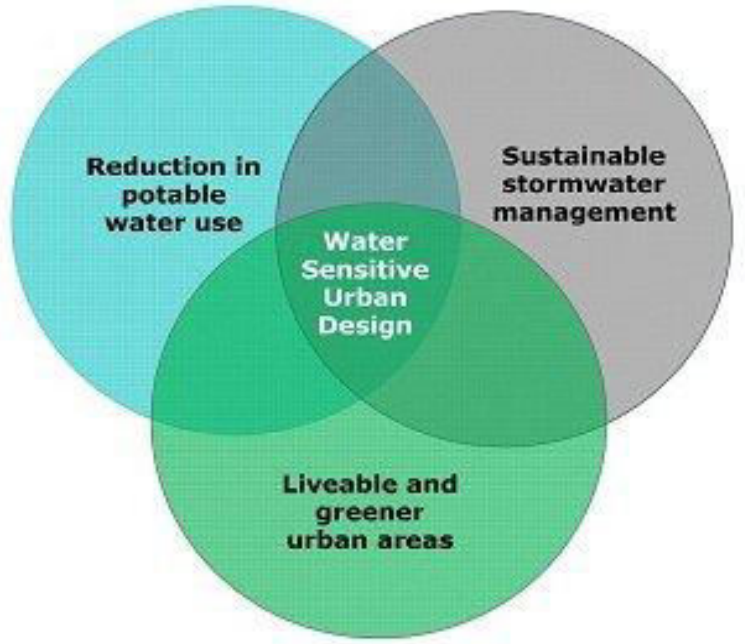
Phase 2- delivery by responsible bodies

USA - BMPs now LIDS
Environmental / Federal driven



Sweden - (famous) Malmö SUDS
Municipality Driven



Australia- WSUD
State driven with increasing Federal support

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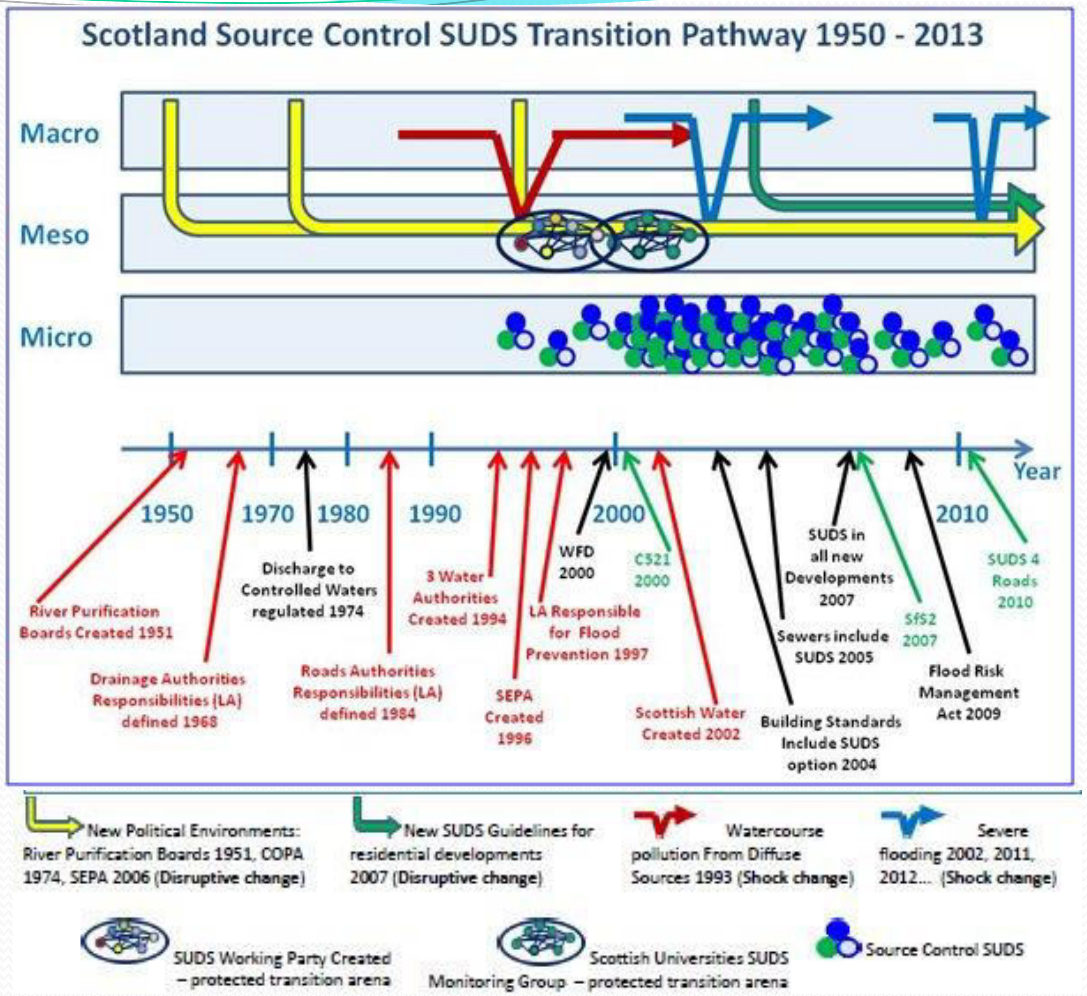
Phase 2- delivery by responsible bodies

Surface Water drainage Responsibilities Scotland



Multi-level Perspective (Geels and Kemp 2000).
Scotland Historical Transition Pathway 1950-2013

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Phase 2- delivery by responsible bodies

- **Four periods of disruptive and shock changes at the macro or political (environmental) level**

  DISRUPTIVE CHANGE

  - Early 1950s - River Purification Boards (RPBs). Powers to monitor and growing awareness of poor water quality
  - COPA 1974 – (more powers) urban drainage as a diffuse source of pollution = primary polluter of water courses
  - Environment Act 1995 SEPA replaces RPBs - drive to implement SUDS began in earnest
  - National SUDS standards 2007 (Scottish Water).

  SHOCK CHANGE

  - 1993 FRPB pollution study and 2002 severe flooding in Glasgow = wake-up call to further consider SUDS.

- **Two enabling factors at the meso or regime level**
  - Scottish SUDS Working Party 1997 committed to promoting SUDS implementation.
  - Scottish Universities SUDS Centre of Excellence research to validate SUDS application for the local climate

- **Source control SUDS niche's at the micro level due to the above enabling factors evolving together.**

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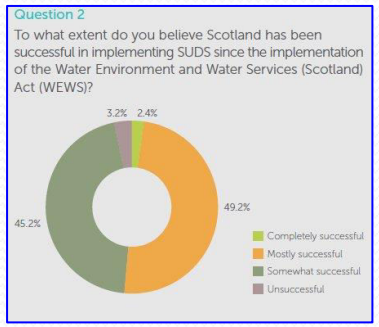
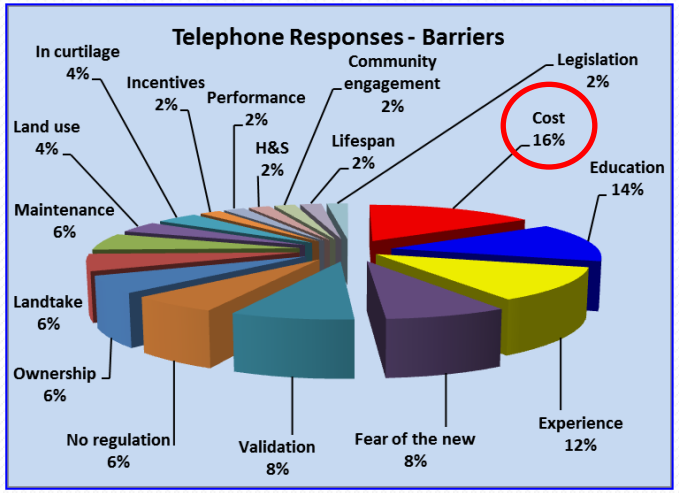
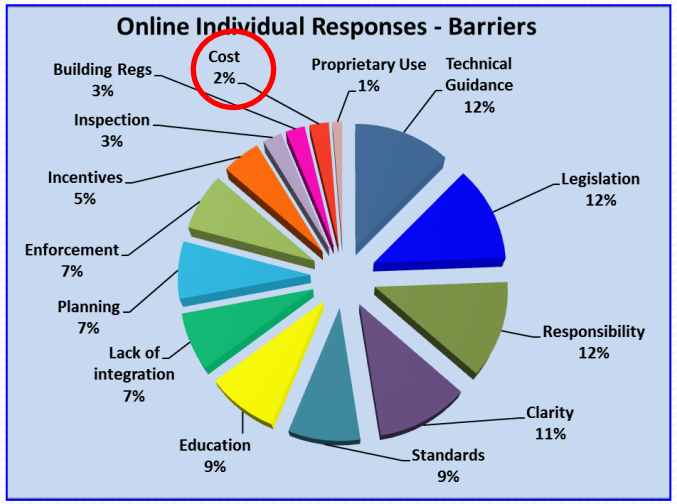
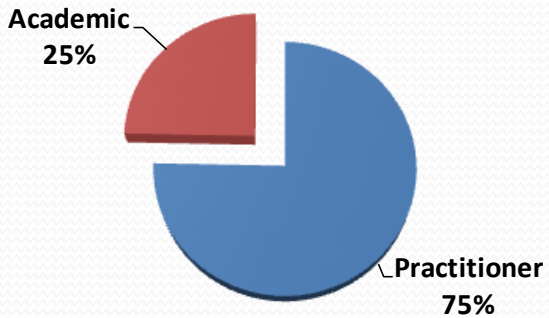
Phase 3- Workshop and survey findings

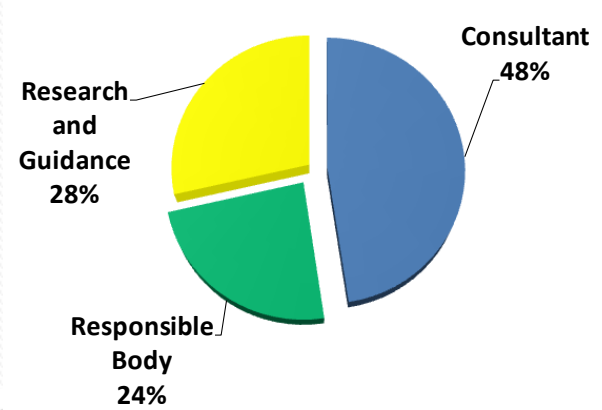

Survey shows Scotland leads on SuDS installation











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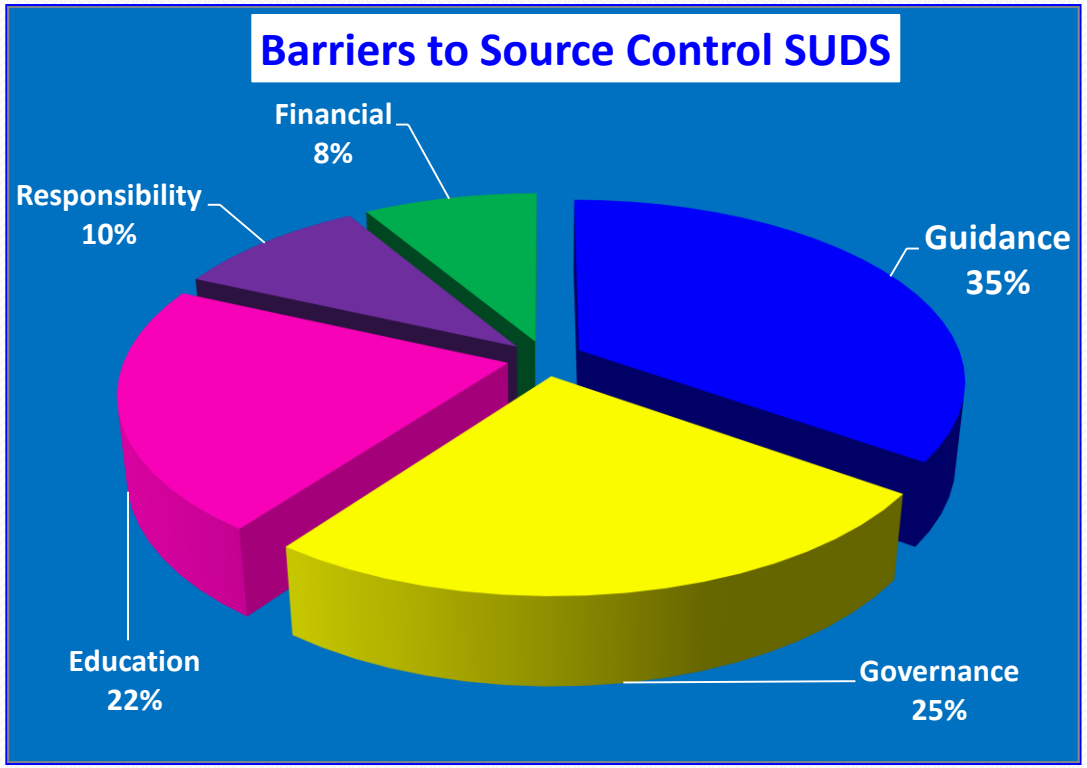
Phase 3- workshop and surveys

Barrier Categories	Grouped categories
Benefits Technical guidance Functionality Standards Treatment train Terminology	Guidance
Legislation Regulation Building Regulations Enforcement Inspection Planning Inter-agency collaboration	Governance
Community Engagement Best practice case studies Validation Experience Fear of the new	Education
Implementation Land use / take Incentives	Financial
Maintenance In curtilage ownership H&S	Responsibility



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Long-term shared vision

Strategic plan (10-15yrs) with short-term milestones

Source control toolkit

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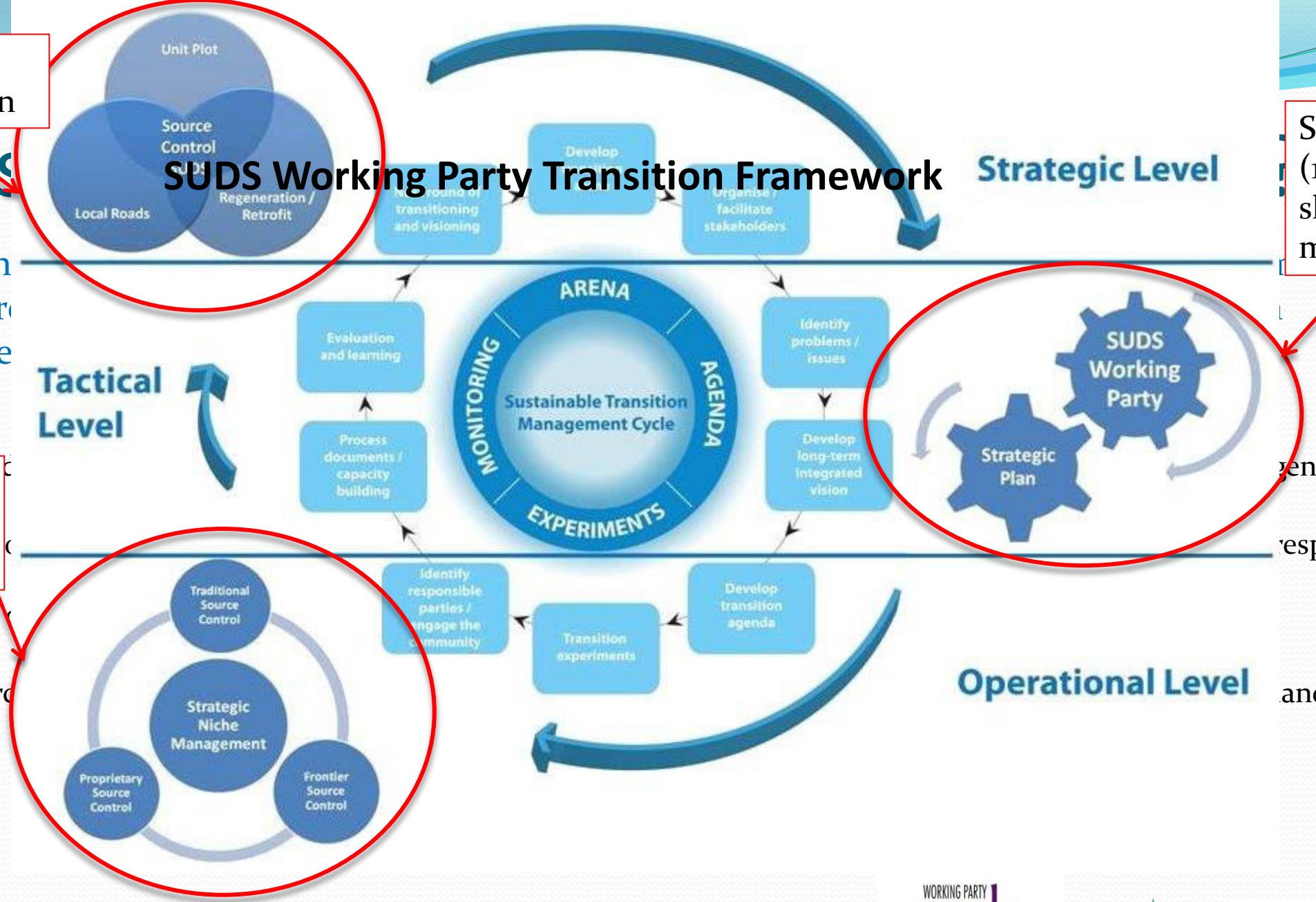

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Phase 3- SUDSWP recommendations

- Strengthen links and develop an vision that encompasses aspirations
- Baseline assessment to gauge uptake / performance, revise guidance
- Encourage application in the land use opportunities and toolkit identified
- Explore opportunities to promote and disseminate information
- Encourage research partnerships to validate emerging techniques

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Phase 3- Policy recommendations

- Scottish Government undertake a National SUDS project in recognition of the new flood prevention and management requirements of LAs which adds a new impetus to the provision of SUDS.
- A national SUDS inspection programme (SIP), including asset register would provide evidence base for future actions and improvements to ensure cost effective, fit for purpose measures – poor examples were cited as one of the key barriers to their uptake.
- Building Standards Division should ensure statutory duties are not ignored - follow up with sign-off / inspection programmes.
- All public bodies with statutory remits should also be encouraged to develop and implement their own annual inspection and enforcement policies.

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Thank You for listening!